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**FOREIGN
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JPRS Report

Nuclear Developments

Nuclear Developments

JPRS-TND-89-009

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SOUTH AFRICA

Sites for 2 Nuclear Power Stations Noted
51000004 Johannesburg THE STAR in English
22 Mar 89 p 5M

[Article by Norman Chandler]

[Text] Eskom has pinpointed more coastal sites at which nuclear power stations may be built.

One is in the Garies district on the north-western Cape coast and the other at an unidentified area on the Natal North Coast.

Eskom disclosed last week that a site at St Francis Bay, a luxury eastern Cape resort, had been earmarked for a nuclear generating plant.

These are the first positive indications from the power utility that nuclear energy is being seriously looked at as an alternative source of power. The country's coal reserves are likely to be exhausted by the middle of the next century.

When the three come into operation—probably only in the mid-2000s—it will bring to four the number of nuclear plants in this country.

Eskom management yesterday emphasised that the five-year-old Koeberg nuclear power station, near Cape Town, would probably be South Africa's only such installation for generations to come. It became operational in 1984 and is one of 27 power stations run by the utility.

Evaluation

They said careful evaluation of all factors involved in the siting of the three plants were being undertaken by universities and other research organisations. These include environmental impact, regional planning, population trends, cost and transport.

Dr John Maree, chairman of the Electricity Council, which controls Eskom, told THE STAR yesterday that he could not see coal resources being exhausted until "well into the next century, probably around the year 2060."

However, at some stage, South Africa would need to bring nuclear energy into the electricity generating system on a far greater scale than was happening now.

"It would be irresponsible of us not to have sites available on which to erect nuclear power stations, but I want to emphasise that if we talk about a potential site, it does not mean that we will build there."

Mr Ian MacRae, the chief executive, said: "We have no future nuclear power station on our programme right now."

"We will, however, from the next century require additional capacity in our generating systems."

Mr MacRae said that it had to be realised that nuclear energy was cost-prohibitive.

"The greatest constraint on nuclear power is the cost versus the cost of coal, but somewhere down the line, and many years away, we will have to swing towards nuclear power."

Radiation Centers To Monitor Daya Bay Plant
HK2104024389 Hong Kong SOUTH CHINA MORNING POST
in English 21 Apr 89 p 1, 2

[Article by Andy Ho]

[Text] The government will spend \$30.8 million on Hong Kong's first comprehensive radiation monitoring and assessment program which will enable the Royal Observatory to check radioactivity levels at the future Daya Bay nuclear power station.

The scheme will serve as the territory's early warning system in the event of a major mishap at Daya Bay, about 30 km northeast of the border.

Six new radiation monitoring centres will be set up in addition to the existing facilities at King's Park, Yuen Ng Fan, Shataukok, and Tsim Bei Tsui.

The program also covers three radiological survey teams, a food and drinking water monitoring scheme, and extra protection for field and laboratory emergency personnel.

Taxpayers will have to spend another \$7.2 million a year to maintain the program, which forms the corner stone of Hong Kong's overall Daya Bay contingency plan.

The 16 government groups involved in the emergency plan will conduct a full-scale nuclear fallout emergency exercise in December 1990, before the first of the two Daya Bay 900-megawatt reactors comes on stream.

The United Nations' Vienna-based International Atomic Energy Agency has agreed to help develop the exercise and evaluate the contingency plan's effectiveness.

The radiation monitoring program will be tabled at the Legislative Council's Finance Committee meeting next Wednesday for endorsement.

But officials have appeared uncertain about the final financial implications of Hong Kong's Daya Bay emergency plan.

In a briefing note to the councillors, the government said: "As nuclear emergency preparedness is a completely new area of activity in Hong Kong, the program may have to be revised in the light of experience gained during its implementation, in particular for the exercise to be carried out in 1990, and resource requirements adjusted accordingly."

A Radiation Monitoring and Assessment Branch, headed by an assistant director, will be established at the Royal Observatory to take charge of personnel training.

It will also be responsible for the planning and management of the program, which is scheduled to be implemented in the current financial year.

As the day-to-day operation of the equipment will be highly automated, the program will only involve a small number of professional and technical staff.

It is estimated that the Royal Observatory and the Hospital Services Department will only need an additional staff of 20 and two respectively for the program by 1991-92.

On the recommendation of the United Kingdom Atomic Energy Authority at Harwell, a Monitoring and Assessment Centre will also be set up at the Royal Observatory to assess the seriousness of any Daya Bay accidents.

It will be tasked with:

Monitoring data from Daya Bay and other installed monitors.

Confirming whether a release of radioactive materials has actually taken place.

Coordinating all monitoring, sampling and analysis.

Assessing the nature, magnitude and extent of the radiological hazards from any release.

Keeping the centre of command for emergency actions—the Civil Control Centre—fully informed of the situation and recommending the counter-measures to be taken.

If an alert is activated, additional Royal Observatory officers with proper training will be temporarily deployed to the centre.

The centre controller will also be assisted by a computerised accident consequence assessment system for quick interpretation of data and location of the population and property at risk.

Site Being Sought for Sino-Soviet Power Plant
HK1904010989 Hong Kong HONGKONG STANDARD
in English 19 Apr 89 p 7

[Text] Experts from China and the Soviet Union are cooperating in a search for sites to build a hydro-electric plant on the Heilongjiang River on the eastern Sino-Soviet border.

The two sides have held negotiations in Heihe, a Chinese border town facing Blagoveshchensk on the other side of the river, an official in Beijing told the HONGKONG STANDARD.

The project will be the biggest-ever joint venture between the two countries. The estimated cost of 2 billion yuan (HK\$4 billion) will be shared equally by Moscow and Beijing.

The plant is designed to have a capacity of between 200 and 300 megawatts—bigger than China's Daya Bay 180-megawatt nuclear plant near Hong Kong.

Mr He Yonglin, executive director of administration for the Heihe area, said feasibility studies had already been made.

"Now we need to choose a site," said Mr He, who expected three would tentatively be chosen for the first phase of the project.

Mr He, who has been working in the Heihe area for 30 years, said the city was originally listed as an optional location for the site.

Heihe is the seat of the local government of Heihe area, as is Blagoveshchensk of Russia's Amur province.

However, the Soviet team found that building a dam there could submerge a vast area of usable land and that option was dropped, said Mr He.

"We will both benefit from the project as we both need electricity for economic development."

"Water containment will help prevent flooding, which is a common occurrence especially on the Soviet side of the Heilongjiang," he said.

"We first wanted to build on the lower side because that's nearer to big cities which need electricity badly. But the Soviets favoured the upper side for better flood prevention."

"Most probably, we'll build one dam on the upper stream and the other on the lower one," he said.

The official added that border trade at Heihe had improved considerably since September 1987. It had stopped for 21 years during the Cultural Revolution and the aftermath.

The city was opened as one of a few "ports for state exchanges of goods" in 1985.

The first items of trade included the supply by China of 208 tons of watermelons in exchange for 350 tons of Soviet fertilizer.

Heihe also exports labourers to the Soviet Union. There are already 500 Chinese workers on the Soviet side, mainly in the construction and timber industries.

"Another 800 people will cross the border from our side this summer," Mr He said.

During the hostile 1970s, the Heihe area was classified as a military frontier—an outpost guarding against Soviet invasion—after the two sides clashed at Zhenbao Island at the River Ussuri in 1969.

Between 1969 and 1973, the local government moved from Heihe to an inner area.

The situation changed after a visit by former Communist Party General Secretary Hu Yaobang, who recognised the need for a port in the north.

Nuclear Fusion Tests, Experiments Successful

Successful Nuclear Fusion Tests Reported

OW2204124489 Beijing Domestic Service in Mandarin
0930 GMT 22 Apr 89

[Text] According to a station report, a nuclear physics and chemistry research unit of the Engineering and Physics Research Institute under the China Nuclear Industry Corp. yesterday successfully conducted nuclear fusion experiments at room temperature, using two different methods of electrolysis and adsorption.

Members of a scientific research team inserted an electrode of platinum and another electrode of palladium into deuterium oxide. Neutrons were produced 120 hours after electricity was applied at a speed of approximately 100 and more neutrons per second. Experts confirmed that the neutrons produced during the experiment were truly the product of nuclear fusion.

On the same day, another scientific research team also adopted a different method in carrying out experiments in this connection. It also detected a considerable number of neutrons from nuclear fusion.

Further on Successful Experiments

OW2204153889 Beijing XINHUA in English
1446 GMT 22 Apr 89

[Text] Chinese scientists claimed that they have, following foreign counterparts, succeeded in obtaining "cold fusion" at room temperature, a spokesman from the China National Nuclear Industrial Corp. announced today.

The spokesman said two research teams of the Nuclear Physics and Chemistry Institute under the corporation have detected neutrons produced by nuclear fusion at room temperature in two experiments on 21 April.

In one of the experiments, two electrodes of platinum and palladium were put into heavy water and electrified, and neutrons appeared 120 hours later.

A similar result was achieved in another experiment conducted by another research team using deuterium and palladium electrodes.

Meanwhile, scientists from the Beijing Normal University claimed that they have also succeeded in obtaining nuclear fusion at room temperature.

They said neutrons were detected in two experiments, which were carried out by them on 18 and 19 April, respectively.

It is reported that successful experiments of nuclear fusion at room temperature have already been conducted by scientists from the United States, Britain, Hungary, the Soviet Union, Poland, Italy, Japan, and South Korea.

However, early this week a group of Chinese scientists expressed their disbelief about the reported "cold fusion" experiments.

Beijing Normal Scientists Progress in Fusion Test
OW2304153289 Beijing Television Service in Mandarin
1300 GMT 23 Apr 89

[Text] China's scientists have made important progress in conducting research on nuclear fusion at room temperature. A research group composed of experts in nuclear physics and chemistry from the Beijing Normal University began an experiment on 18 April, using experimental equipment similar to that utilized by Fleischmann. The group obtained similar experiment results on 19 and 20 April.

By using an ST-451 liquid scintillation spectrograph, the group detected neutrons produced by the deuterium-deuterium reaction. By using liquid scintillation, the group also detected tritium produced by the reaction. This is the first time that Chinese scientists have observed nuclear fusion at room temperature.

JAPAN

Team Succeeds in Nuclear Fusion Tests

OW1704130089 Tokyo KYODO in English
1245 GMT 17 Apr 89

[Text] Tsukuba, Ibaraki Pref., April 17 (KYODO)—A Japanese research team on Monday said it has succeeded in ultralow-temperature nuclear fusion tests.

Kanetada Nagamine, a leader of the team, said the tests were known as "muons (an elementary particle) catalyzed nuclear fusion experiments."

A blend of heavy hydrogen and tritium, liquefied at a temperature of 253 C below zero in liquid helium, was irradiated with beams of pulsed muons. These muons were produced by an accelerator, Nagamine said.

He said that as a result, a large number of 14-megaelectronvolt neutrons—peculiar to nuclear fusion reaction—were detected. Nagamine said judging from the number of neutrons detected, the team estimated that about 7 billion nuclear-fusion reactions occurred in about 200 hours of muon-catalyzed N-fusion tests.

The research leader also said the team derived from such tests valuable basic data for figuring out how much energy could be produced by this method—muon-catalyzed N-fusion.

The tests were conducted by a team of researchers from the University of Tokyo, the Institute of Physical and Chemical Research, the Japan Atomic Energy Research Institute and the Ministry of Education High-energy Physics Research Institute.

INTRABLOC AFFAIRS

GDR, USSR, FRG Reactor Safety Cooperation
AU1904083989 East Berlin NEUES DEUTSCHLAND
in German 18 Apr 89 p 5

[Text] Garching (ADN)—On Monday [17 April] a seminar on the joint dealing with selected problems of nuclear safety started in Garching near Munich; on the basis of the existing bilateral contractual relations between the GDR, the USSR, and the FRG, the seminar is attended by experts from these three states. The main issues are the scientific-technological bases of the requirements for nuclear power plant safety, the technical means to ensure safety, the simulation of accidents, and the monitoring of the state of components in nuclear facilities.

CZECHOSLOVAKIA

Nuclear Safety Accord Signed With U.S.
AU1704141289 Prague RUDE PRAVO in Czech
15 Apr 89 p 7

[Zdenek Porybny dispatch: "A Nuclear Safety Accord With the United States Aimed at Helping To Improve the Exchange of Experience in Enhancing the Safety in Nuclear Power Plant Operations"]

[Text] Washington (By our reporter)—Lando Zech, chairman of the U.S. Nuclear Regulatory Commission, and Stanislav Havel, chairman of the Czechoslovak Atomic Energy Commission, have signed an organizational accord on the exchange of technical information, knowledge, and experience in providing for the safe operation of nuclear power plants and facilities between their two institutions. The accord, signed on the premises of the U.S. commission's headquarters in Rockville, near Washington, on Friday [14 April], also envisages an exchange of experts.

This accord is the second of its kind signed by the United States with any socialist country. (The first was concluded with the USSR in 1988.) In replying to a question asked by our RUDE PRAVO reporter, the chairman of the Czechoslovak Atomic Energy Commission, S. Havel, stated that the accord is advantageous for both sides since it will help to make the operations of nuclear power plants in both countries much safer. The United States currently has 110 nuclear power plants in operation with a total capacity of 100,000 megawatts of installed output—the highest in the world. In this sphere the United States is among the top countries in the world and its experience is of interest to us.

S. Havel then stated that "the fact that the United States is interested in exchanging experience with our country confirms the good reputation enjoyed by our nuclear power program in the world. We have agreed with our American partners that the exchange of experience in supervisory and control activities and also in the sphere

of approval processes, inspections, the education of operating staff, and the issuing of generally binding regulations is of particular significance."

The Czechoslovak delegation also included Jiri Kubicek, director of the Skoda concern in Plzen. When asked what had interested the American partners most, he replied: the long-term prospects of our nuclear power engineering. For instance, the Westinghouse firm, an outstanding world producer of nuclear power installations, has shown specific interest in cooperation with the Skoda concern in the technical and commercial spheres.

Nuclear Inspector on Power Plant Safety
AU1404132989

[Editorial Report] Prague PRACE in Czech on 13 April carries on page 5 a 1,500-word interview by Rudolf Unger with engineer Jiri Beranek, chief nuclear safety inspector of the Czechoslovak Atomic Energy Commission, headlined "Is the Operation of Nuclear Power Plants Safe?" Beranek states that the authorities are contemplating the renovation of the two oldest operating Czechoslovak nuclear reactors of the V-1 type in Jaslovské Bohunice because they belong to a group of reactors whose design "does not quite correspond to present-day safety requirements." He goes on to say that "from an ecological point of view, it is obvious" that the CSSR "cannot avoid gradually replacing coal-fired power plants by nuclear power plants. Any slowdown in the construction of nuclear power plants would only make the situation worse, and our commitments—also vis-a-vis foreign countries—would be seen as unreliable." Beranek further says that making sure that nuclear power facilities operate with maximum safety and reliability is of decisive importance.

POLAND

Chemist Outlines Procedure, Results of Fusion Experiment
51003003 Warsaw POLITYKA in Polish
No 15, 15 Apr 89 p 10

[Interview by Jan Dziadul with Dr Engineer Jerzy Zak, 1968 graduate of the Technical University of Silesia in Gliwice, postgraduate student at the Technical University of Warsaw while employed in industry; since 1970, employee of the Section of Chemical Physics at the Institute of Inorganic Chemistry and Technology headed by Prof Dr Jerzy Strojek; in 1981 through 1983, visiting scientist at the Ohio State University (U.S.): "A Ridiculously Simple Experiment"; date and place not given]

[Text] [POLITYKA] Doctor, I will admit that I came here with a dose of skepticism. For about 40 years now, the largest laboratories of the world have been spending billions in order to harness nuclear energy; thousands of scientists have unsuccessfully tried to perform controlled nuclear fusion. On the other hand, electrical chemistry

specialists Martin Fleischman from Southampton University in Great Britain and Stanley Pons from the Utah University in the U.S., who were the first to conduct the pioneering experiment, announced that they had carried it out in a ridiculously simple manner. You have already managed to say that an average chemistry student is capable of performing this experiment. The impossible suddenly became possible? Is this to say that the avenues of search to date have been erroneous? Is it still possible that solutions of epoch-making significance for mankind would "hide" in incredibly simple arrangements?

[Zak] As recently as several weeks ago, nobody believed that such an experiment was at all possible! I would have scoffed at anybody who would have suggested that controlled nuclear fusion can be performed at room temperature, using a small sample. Relevant research is performed in giant installations called tokamaks in which temperatures several million degrees high are obtained, and an attempt is made to keep them so for millionth fractions of a second. Issues of this nature used to be the domain of nuclear physics; nobody could get it through his head that performing controlled fusion was possible outside this field of science. Only one avenue of research existed. When I heard a radio report before the holidays I was sort of interested in this unusual event, but not enough to get excited. This was not my field of research. I know about nuclear physics in conjunction with academic training. However, I admit that later, when I read a report in FINANCIAL TIMES on the authors of the epoch-making discovery, electrical chemistry specialists of world renown, my surprise was boundless. Could it be that the key to cheap energy is in our pockets? On the other hand, authorities such as Fleischman and Pons do not lend their names to dubious solutions.

[POLITYKA] Excuse me, doctor, but is this to say that, if everything is so banally simple as the discoverers have evaluated, you and other electrical chemists have been going in circles every day around a sensational achievement but there was no... What I mean exactly is, what wasn't there?

[Zak] There was no fantastic thought violating the rules of the game to date! Some argue that this was chance. The authors have said that their work had lasted for more than 5 years, but they had treated their unlikely assumption rather as a hobby, without much confidence in success. They have covered the outlay for the experiment with their own funds, so we can surmise that they were doing it quietly. Were the others not far behind? I am convinced, since the time the experiment of Fleischman and Pons was replicated, that many scientists have thought about an unknown source of energy which appears in research of this kind. However, they passed it over. This was nothing important, or nothing that interfered with experiments in a major way. One needed truly fantastic imagination in order to link this phenomenon with a nuclear reaction.

[POLITYKA] For pointing the way, and this is how we may perhaps define the first experiment by the American-British team, they deserve a Nobel prize. However, what do you mean by saying that this was accomplished "in a ridiculously simple manner?"

[Zak] As briefly as possible, the essence of nuclear reaction consists of combining light atomic nuclei into atomic nuclei with a greater mass. A considerable amount of energy is then released. Here I would once again like to make the reservation that I am explaining issues not associated with my field of interest. Thus far, the difficulty has been that more energy was expended than obtained. Also, a reliable method of controlling fusion could not be found.

[POLITYKA] This is how FINANCIAL TIMES wrote about this sensational experiment: "The two scientists have used electrochemical methods in order to achieve the fusion of deuterium embedded in a palladium electrode, a metal similar to platinum."

[Zak] This very statement prompted me to replicate, or check out, the experiment. Palladium is a commonly used catalyst with the help of which certain energy barriers are overcome. It is also known that it dissolves hydrogen best when it is used as an electrode in experiments. Another name for that is hydrogen absorption. One unit of palladium "absorbs" about 800 units of hydrogen in volume. A compression of sorts of the hydrogen occurs, and as we now know, nuclear fusion takes place at the time. It is also important that at room temperature hydrogen is split from elemental to atomic. If there were no catalyst (palladium), temperatures of a dozen or so million degrees would be needed for such a reaction. This is the case in experiments conducted in a pure water environment, and there is nothing unusual about this. Stanley Pons and Martin Fleischman used heavy water rather than usual water, and received deuterium, or an isotopic variety of hydrogen, as a result of electrolysis.

[POLITYKA] Was your experiment a faithful copy of the original one?

[Zak] Yes, perhaps yes, because I do not know all the details yet. I thought about this throughout the holidays. I had everything needed for the research except heavy water. Under normal conditions, it should be ordered from Swierk, but I was in a great hurry... It is hard to even describe the feeling of wanting to be around what is an epoch-making event at the very least. On Tuesday after the holidays, I succeeded in getting a small amount of heavy water, and I embarked on the experiment immediately. This took perhaps half an hour; in subsequent days, I repeated the research...

[POLITYKA] I apologize for a request thus put, but could you describe in an easy-to-understand manner the event which may change our civilization?

[Zak] During the electrolysis of heavy water on a palladium electrode, the deuterium which has penetrated the crystal structure of metal was given off. After saturation, small bubbles appeared on the surface of palladium. Therefore, the experiment conducted under electric current, in a sense, resembled charging a battery because after the charging is complete the energy expended may be retrieved by using this system as a source of current. In the reverse process, that of retrieval, gaseous deuterium is transformed into ions soluble in the heavy water. As it turns out, the reaction is accompanied by the fusion of deuterium nuclei in palladium, without which the entire process would require colossal temperatures comparable to reactions taking place on the Sun.

[POLITYKA] Therefore, nuclear fusion occurs in palladium! Why exactly in palladium?

[Zak] With some reservations, we might say that this is exactly the essence of the revelation; however, we do not know absolutely why it happens this way. It is known that palladium accumulates energy, but it is not known why! This is exactly what's fantastic and... unexplained!

[POLITYKA] Fleischman and Pons do not know this either?

[Zak] I do not believe so. However, it is certain that without solving this problem we cannot dream about a new era in power generation.

[POLITYKA] What is the, so to speak, "tangible" proof that nuclear fusion has occurred?

[Zak] The process is accompanied by the diffusion of free neutrons and tritium, or typical by-products of nuclear fusion. I also registered radiation. In the process of "discharging" the palladium we secure greater energy effects than those previously expanded for saturating it with deuterium. This can be called flameless combustion!

[POLITYKA] How much more energy do we receive? Isn't it perhaps the most significant point in the entire issue of controlled nuclear fusion?

[Zak] Every experiment produces a different result. In my case, these were amounts 2 to 3 times greater. Reportedly, Fleischman and Pons have received even more favorable results. This may not be too much, but we are only at the beginning of a long road.

[POLITYKA] What will happen when we are at its end? When will that happen?

[Zak] We will obtain an altogether unimaginable source of inexpensive and clean energy. The authors of the discovery are apparently talking about a period of 20 years. Personally, I am an optimist, as I am aware of, say, the American determination in searching for nonconventional energy sources after the 1974 crisis. This should come about sooner. The prospects may be visualized with the following

examples: in a cubic meter of water (1,000 liters) there are about 30 milliliters of heavy water. In one kilogram of regular water there is so much of this fuel that the energy generated in the process of nuclear fusion may replace 350 liters of gasoline.

[POLITYKA] However, producing heavy water is also very costly!

[Zak] Correct. However, thus far the need for it has been met, and, therefore, in principle cheaper methods of producing it were not sought. Theoretical approaches have already been worked out, so I do not see a problem here. There may be some problems only with the radiation. However, they should not be any greater than in the case of fission of the nuclei of heavy elements with nuclear energy.

[POLITYKA] Do you see in this sensational discovery any temptation for the military complexes?

[Zak] Fortunately, I do not, except in the sense that the energy so generated may be used for various purposes. However, in this instance an explosion is unlikely. This process is naturally controlled; its rate is restricted by many physical and chemical phenomena which are difficult to even discuss now. At this time, I may note that the process is too controlled to attempt generating the desirable amount of energy.

[POLITYKA] As a specialist in electrical chemistry, do you think that the nuclear physicists have been humbled in a sense?

[Zak] No, I don't. I think they have only been astonished. I have also encountered disbelief on their part. However, I believe that we should work on this issue together; the research of nuclear fusion should be interdisciplinary. After all, they have an experience of several decades which we lack.

[POLITYKA] What niche do you see for yourself in future research involving this problem?

[Zak] Several weeks ago, I submitted a research program covering other topics. However, it would be logical for me to get involved in the work on nuclear fusion, but this does not depend on me anymore. In any event, money for such research should be found immediately. In the U.S., the Department of Energy has stated its willingness to fund such work. Several successful experiments with nuclear fusion have been already performed in Poland. Therefore, at this moment we are among world leaders...

[POLITYKA] Just as we were years ago with optical wave-guides?..

[Zak] It would be a pity to waste yet another chance!

[POLITYKA] We congratulate you on your success, even if it is just a replication of the experiment. Thank you for the interview.

ARGENTINA

Crespo on Condor Project, Armed Forces' Role

PY1404194489 Buenos Aires TELAM in Spanish
1346 GMT 14 Apr 89

[Excerpt] Buenos Aires, 14 Apr (TELAM)—Air Force Chief of Staff Brigadier General Ernesto Crespo has said that, "in the last few years, the members of the military have changed a lot, and they have been reintegrated into society." He also categorically rejected the possibility that "the Armed Forces will take part in an eventual coup d'etat."

He also denied that there is any connection between the negotiations he and Defense Minister Jaunarena carried out during their recent trip abroad and the halting of the development of the so-called Condor project. Crespo said that "the issue was not discussed in any of the countries we visited (Israel, the FRG, and Spain)."

He expressed his concern over the fact that "the Argentine media is responsible for discussing this issue, which should be decided strictly by Argentines."

Crespo said that with this news report—according to which Israel will lift the embargo on the delivery of planes purchased by Argentina if Argentina drops the Condor project—"we are informing the world about a nonexistent situation."

For several years Argentina has been developing a prototype called Condor II, a medium-range rocket used to place satellites in orbit 500 km from earth. Iraq and Egypt are cooperating in this project.

Answering a question, Crespo said: "I do not believe the Armed Forces will ever take part in a coup d'etat because the Armed Forces have learned a lesson the hard way: To be rejected by your society is something terrible."

He asserted that the military "has been reintegrated into society. They seriously believe that the country must find a political solution to pull it out of the crisis. The military must help to find this solution because it is part of Argentine society." [passage omitted]

Embalse Nuclear Plant Reportedly Shut Down

PY2004025489 Buenos Aires NOTICIAS
ARGENTINAS in Spanish 0100 GMT 20 Apr 89

[Text] Buenos Aires, 19 Apr (NA)—It was learned from unofficial sources that the Embalse Rio Tercero nuclear plant was unexpectedly shut down today. Thus the country has been left without nuclear power, because Atucha I was also shut down and Atucha II is still under construction.

The sources said the Embalse nuclear plant was scheduled to shut down on 2 July for maintenance.

It is not known what caused this unexpected drop in energy supply.

It is not known either if fuel-powered and hydroelectric plants will be able to compensate for the loss of energy caused by the Embalse shutdown.

Loans Contracted With FRG for Nuclear Plant

PY2004170289 Buenos Aires TELAM in Spanish
1417 GMT 20 Apr 89

[Text] Buenos Aires, 20 Apr (TELAM)—The executive branch has authorized the National Commission for the Atomic Energy (CNEA) to sign three additional contracts on a loan contract already signed with two FRG financial institutions for the constructions of the Atucha II power plant.

By means of Decree No 513/89, published in the OFFICIAL GAZETTE today, President Raul Alfonsin has authorized CNEA Director Ema Perez de Ferreira to sign the additional contracts. He also authorized the Economy Ministry to guarantee the contracts in the republic's name.

The decree states that the FRG financial institutions had already granted the CNEA two DM850 million loans, each to finance the purchase of material, equipment, and services for the Atucha II power plant. The original two DM850 million loans will now be increased through these new additional contracts.

The first additional contract, which will be signed between the CNEA and Kreditanstalt fur Wiederaufbau, is worth DM1,034,875,000. It is made up of a DM850 million original loan, plus an additional DM184,875 million.

The two additional contracts will be signed between the CNEA and the Westdeutsche Landesbank Girozentrale for DM1,034,850,000, made up of an DM850 million original loan plus an additional DM184.875 million.

CNEA Chairman Praises Research Achievements

PY1704222289 Buenos Aires TELAM in Spanish
1900 GMT 17 Apr 89

[Text] Bariloche, 17 Apr (TELAM)—Emma Perez Ferreira, chairwoman of the National Commission for Nuclear Energy [CNEA], has noted the importance of "maintaining the excellent level of basic research" and said she is sure that the new economy minister will grant the commission "significant support." Perez Ferreira made this statement during a recent visit to the Bariloche nuclear plant.

The CNEA chairwoman also mentioned the FRG credits obtained to finish (in 1994) the Atucha II plant and the Swiss loan for the heavy water industrial plant that is scheduled to become operational next year. Perez Ferreira pointed out that "we have achieved something

quite unusual by obtaining foreign credits to finance local projects. She then explained that "it is difficult to obtain foreign loans for Argentine enterprises that offer supplies and services."

When asked about her visit to the Bariloche atomic plant, Perez Ferreira said that "this is a good example of what can be achieved through a good level of basic research programs carried out over a long enough time."

Regarding the achievements of the local nuclear plant, she said that "we repeated the experience of the superconductivity of ceramic exposed to high temperatures a week after the phenomena had been discovered, and obtained the same results. This gives our country a great advantage for entering the superconductivity era."

Regarding cold nuclear fusion tests, which have caused great repercussions among the various CNEA research teams that are individually trying to repeat the experience, she said that "from our point of view, these isolated efforts should be coordinated under the supervision of the CNEA research and development director, headquartered in Buenos Aires."

Answering another question regarding the presidential candidates, the CNEA chairwoman said that "we have not maintained contact with any candidate; however, some CNEA members are militants of some of the majority parties and they convey the commission's ideas and problems."

BRAZIL

Satellite Launching Postponed Until Mid-1990

PY2404170489 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 22 Apr 89 p 10

[Text] The launching of the entirely Brazilian-made satellite has been postponed once again by the National Institute of Space Research (INPE). The SCD-1 satellite will now be ready in June 1990. At least 3 months will be needed to make the preparations at the launch site in Alcantara, Maranhao State, and so the satellite will be ready to be placed in orbit in September 1990.

The new timetable implies a delay of 1 year over previous predictions. Along with the efforts to complete the construction of the satellite, which has already cost \$118 million, the country is making efforts to build, using its own technical resources, the Satellite Launching Vehicle (VLS) through the Space Activities Institute (IAE), a branch of the Aeronautics Ministry. The problem is that the VSL construction timetable is delayed even further, and it will certainly not be completed before 1992.

The INPE decision to delay the satellite launch by 12 months will be announced over the next few days to the Brazilian Space Activities Commission (COBAE), the agency that coordinates the entire program. With this,

the Brazilian program is setting aside a political problem: if the satellite is ready this year, well ahead of the VLS, a foreign launching agency would have to be contracted. The VSL would only be used in future missions. The possibility of having to hire a foreign launching agency is opposed by the military who insist that the plans of the Brazilian Complete Space Mission (MECB) must be maintained.

The SCD-1 will be placed in a 750-km-high orbit for 1 year, at a speed of 27,000 km per hour, orbiting the earth in 1 hour and 40 minutes. Its function will be to collect meteorological information (temperature, water levels in rivers and dams, air and soil humidity content, sunlight time, rain volume, and others) from 10 land stations around the nation's territory where there are no phones.

The information collected by the satellite will be transmitted at least six times per day to a receiving land station in Cuiaba, Mato Grosso, for distribution to consumers around the country.

Navy Minister on Nuclear Submarine Reports

PY2004032489 Brasilia Domestic Service in Portuguese 2200 GMT 19 Apr 89

[Text] Brazil will not be as great as we want unless it masters the most modern technologies in the world, including those necessary to construct nuclear-powered submarines. Navy Minister Henrique Saboia made this statement today while denying that Brazil is building nuclear submarines in the municipality of Ipero, Sao Paulo State.

Saboia also denied the existence of a uranium enrichment pilot plant, as reported by the press. He admitted, however, that mastering those technologies is vital for the development of any country.

[Begin Saboia recording] The Navy is participating in the Brazilian nuclear program; everyone knows that. We have the (Alvaro Alberto) plant in Aramar, where we produce enriched uranium through the ultra-centrifuge process. We are working to enrich uranium up to 20 percent, which is what we need for the established activities.

To make a nuclear submarine, we must first know how to build a submarine. Second, we must be able to design submarines. Third, we must know how to build a nuclear reactor for the submarine. We have three branches of a single program. I hope that by the beginning of the next century we will be able to build submarines propelled by nuclear energy. [end recording]

Sonda IV Rocket Model Launch Set for 27 Apr

PY2004041289 Brasilia Domestic Service in Portuguese 2200 GMT 19 Apr 89

[Text] Barreira do Inferno is preparing to launch the fourth model of the Sonda IV rocket. The launch on 27 April will serve to test the operational qualifications of the rocket. In the future this rocket will serve as a satellite launching vehicle.

The Sonda IV was fully manufactured in Brazil and developed by the Space Activities Institute of the Aerospace Technology Center in Sao Jose dos Campos, Sao Paulo State.

Heavy Water Produced by Combined Process
PY2404151689 Rio de Janeiro O GLOBO in Portuguese
23 Apr 89 p 31

[Article by Fanny Zygband]

[Text] Sao Paulo—The process being developed by Brazil for the production of heavy water is the combination of two methods: electrolysis and the isotopic exchange of deuterium for hydrogen. This process has been kept secret by the National Nuclear Energy Commission (CNEN), which is responsible for the installation of a laboratory-scale pilot heavy water production plant.

In most countries that have acquired the technology for the production of heavy water (which contains a high concentration of deuterium, the heavy isotope of hydrogen), the hydrolysis and the isotopic exchange methods are performed separately. The Brazilian option of combining both methods implies an advance that is under study worldwide and that is intended to increase enrichment to at least 96.4 percent. This percentage is needed for reactors and for nuclear fusion research.

Just like the method for enriching uranium, the production of heavy water in Brazil uses the cascade method, which involves the interconnection of several enrichment cells so that the grade of purity increases as the water flows from cell to cell. This was revealed by Eiiti Matsui, head of the Stable Isotopes and Hydrology Laboratory of Nuclear Energy for Agriculture Center (CENA).

That laboratory, located in Piracicaba, specializes in the study of practical application of isotopes in agriculture, for instance, in the manufacture of fertilizers. According to Matsui, the CNEN plans to manufacture heavy water and the laboratory performs a fundamental role: Samples of heavy water produced at the pilot unit are sent there to measure the percentage of deuterium obtained through the electrolysis-isotopic exchange method. These measurements indicate the grade of enrichment obtained.

Matsui explained: "That laboratory has five mass spectrometers and imported equipment that measure isotopic concentrations. Only two institutions in Brazil can measure deuterium: The Sao Paulo University Physics Institute and the CENA. This is why the CNEN contacted the CENA."

The CENA head affirmed furthermore that those measurements have been conducted for almost a year, more or less the same time as the heavy water pilot plant has been in operation. According to him, this deuterium enrichment process basically involves two stages: In the electrolysis stage, when water is separated into its constituent molecules: Hydrogen and oxygen. In the second stage, the

isotopic exchange takes place through a physical reaction that promotes the exchange of the light hydrogen atom for the heavier atom of deuterium.

Matsui explained that the electrolysis process begins with common water mixed with some kind of acid which functions as an electrical conductor. This system is connected to an electricity generator equipped with two electrodes (metal bars that conduct electricity). When a current is passed the water molecules are separated into their components, hydrogen and oxygen. The light hydrogen atoms accumulate at the electrically negative electrode. The oxygen atoms gather at the electrically positive electrode. The heavy deuterium isotopes remain in the water between the two electrodes. In some countries, such as Norway and Canada, the process stops there, and further enrichment is attained through successive electrolysis procedures.

In the Brazilian pilot plant, however, the process goes further and the product of the electrolysis—water containing hydrogen, oxygen, and deuterium—is routed into a special cell overlaid with catalyzers. These catalyzers perform a physicochemical function that accelerates the exchange of deuterium for light hydrogen.

Eiiti Matsui said that since current production is at a laboratory scale, the cascade set up by the CNEN to enrich deuterium is composed of a few cells connecting the electrolysis and isotopic exchange systems. Once the country begins to produce heavy water on an industrial scale, he observed, it will have to increase the number of cascade units and above all, it will have to find a way to reduce the cost of the electrolysis stage, which uses large quantities of electricity. A solution being contemplated by the CNEN is to use energy from the large hydroelectric installations.

Heavy Water Production Project Revealed
PY1704160589 Rio de Janeiro O GLOBO
in Portuguese 16 Apr 89 p 32

[Article by Paulo Motta and Fanny Zygband]

[Text] Brazil is currently building a pilot power plant that will annually produce 1 ton of 99.6-percent pure heavy water. The power plant will be built in 5 years at the most. The site of the pilot plant and the production process to be employed are top secret, but National Nuclear Energy Commission (CNEN) President Rex Nazareth Alves revealed that the project's main objective is to guarantee total Brazilian self-sufficiency in nuclear fusion research and to lengthen the time between reactors' refueling. "Cold" as well as "hot" nuclear fusion requires heavy water and its use as a moderator in place of natural water in enriched-uranium reactors provides an "economy of neutrons."

The secrecy involving the pilot plant's location and the production process is imposed, according to Rex Nazareth Alves, not because of the danger the unit may pose

to the neighboring population, since there is no radioactivity and the residues are plain water, but because of the international reaction that might arise from the announcement that Brazil is closing the nuclear cycle.

Rex Nazareth Alves said: "The heavy water production technology is just as sensible as that for uranium enrichment."

Heavy water is water containing a high concentration of deuterium, a hydrogen isotope. Natural water contains 1 deuterium molecule in 6,000 light hydrogen molecules. In fact, heavy water production involves an enrichment process—like uranium—to concentrate deuterium to 99.6 percent. The production of heavy water is considered strategic, and a liter of it costs nearly \$410 on the international market.

Brazil already had a program for heavy water production, developed by the Military Engineering Institute (IME) in the 1960's and 1970's, but it was interrupted after the decision was made to develop enriched-uranium plants. One of the participants in that project, nuclear engineer Teofilo Chagas, resumed the project last year at the initiative of the CNEN.

Teofilo Chagas said: "We have already managed to increase fourfold the natural-water concentration of deuterium in the laboratory; that is, we have attained a concentration of 500 parts of heavy water per million parts of natural water. In the next stage, when the pilot plant is ready, we will boost that concentration to 3,000 parts of heavy water. At that point, attaining a 99.6-percent concentration will be just one step away."

There are many processes for the production of heavy water. Brazil, however, did not choose any of them. It opted for a combination of processes—one of them the electrolytic—which is kept under seven locks. This combined process is the most modern and, except for an experimental unit in a European country, it is still in the project stage in the developed countries. According to Rex Nazareth Alves, this is the most feasible option for Brazil:

"Those who can afford caviar, eat caviar. We have a lot of rice and beans, and we will eat rice and beans."

Heavy water has a lot of uses. In addition to being essential to studies of nuclear fusion—hot and cold or room temperature—and as a moderator in natural uranium reactors (like the ones in Argentina and Canada), heavy water offers promising research prospects. According to Teofilo Chagas, deuterium can be used as nonradioactive tracer, because it can be incorporated into any hydrogen-bearing molecule that can be monitored by a mass spectrometer.

The CNEN president also revealed that heavy water can be used in Brazil as a moderator in reactors which might equip future nuclear miniplants, if Congress approves

their construction. Heavy water will be quite suitable for the miniplants both because it "saves" neutrons and makes the need for refueling less frequent.

Rex Nazareth Alves said: "Argentina, for example, has natural uranium reactors moderated with heavy water and their efficiency increases with the use of a low-grade enriched uranium. We will do the reverse. We have enriched-uranium reactors moderated with light water which will be replaced by heavy water so that refueling can be made every 18 months instead of every 11 months."

According to Claudio Rodrigues, superintendent of the Nuclear and Energy Research Institute (IPEN), the amount of heavy water the country will need is related to the success of cold-fusion experiments. If the cold-fusion process proves to be successful, Brazil will have to decide whether to import an industrial unit for large-scale production of heavy water—as Argentina did—or to develop its own technology.

Claudio Rodrigues added: "If we take the second option, which is more likely, the logical path to follow will be that of a gradually increasing production. The first step is the experimental stage, which has already been taken. The industrial stage will depend on the approval of Congress."

The IPEN superintendent noted that with its large hydroelectric plants, such as Itaipu and the Urubupunga complex, Brazil has an advantage for the production of heavy water in industrial scale: "During the period of reduced generation to meet reduced demand, these hydroelectric plants can generate energy for electrolysis. In addition, they can provide abundant natural water of good quality."

MEXICO

Laguna Verde Nuclear Reactor Started PA1804032489 Mexico City EL NACIONAL in Spanish 15 Apr 89 pp 1, 11

[Summary] Laguna Verde, 14 Apr—Nuclear reactor No 1, one of the two that the Laguna Verde nuclear power plant will eventually have, was started up and put on line 13 April and immediately began producing electric power for the integrated national electric power system.

In this first test, reactor No 1 began operating at 6-percent capacity, generating 40,000 kilowatts of power, according to Guillermo Guerrero Villalobos, director of the Federal Electric Power Commission. The official added that the reactor will be tested until it reaches its full capacity of 654,000 kilowatts. When both nuclear reactors are in operation, the plant will produce 3.5 percent of the nation's electric power, which now is 24 million kilowatts.

The Laguna Verde nuclear power plant was begun in 1970 and is now 70 percent complete at a cost thus far of \$2.5 billion.

EGYPT

Correspondent Explores Nuclear Capabilities in Industry

51004603 Cairo AL-MUSAWWAR in Arabic
3 Mar 89 pp 38-41

[Article by Ghali Muhammad: "Egypt Enters Age of Nuclear Industry," including interview with Minister of Electricity and Power Mahir Abazah; first paragraph is AL-MUSAWWAR introduction]

[Text] The world now lives in an age of nuclear industry in many important and vital areas. What has our Egypt done to keep up with this age? What steps has it taken in this race? This is the question that the present stage raises. This is the challenge we face. Initially, we lack nothing: scientific resources, human resources, and a pressing need for nuclear power as oil reserves shrink. Despite the small reactor that Egypt possesses, there are signs of Egyptian progress in the field of peaceful nuclear research. Trained cadres have been prepared, and Egypt has entered the beginnings of the stage of nuclear industry. To break the roadblock of monopoly in this important area, we have begun to produce some components of nuclear equipment. We have all the facilities to produce heavy water at levels of purity required by the nuclear industry. More importantly, we have begun to increase the capacity of the Egyptian nuclear reactor in addition to constructing a new 20-megawatt reactor for the research [center]. All this is for a clear Egyptian program to use nuclear technology for peaceful purposes and to go along with the world in this constructive direction. The picture of "nuclear Egypt" is one that requires many details, meetings, and a field visit to the living reality. Let us go to experience the new nuclear reality in Egypt and learn firsthand the most important news and the most important events.

We arrived at the entrance of the Nuclear Research Center that contains the nuclear reactor. The necessary security measures that are taken with every visitor to the center were completed.

We headed for the office of Dr Muhammad Sultan, head of the Nuclear Research Center. The discussion began.

[AL-MUSAWWAR] What is the function of the reactor here?

[Dr Sultan] The reactor's function is limited to research. It is not for the purpose of production, like power reactors. It is considered a source of fast and slow neutrons for use in experiments in physics or neutron physics. It is also used to produce isotopes for use in the field of medical treatment. In this connection we produce radioactive iodine and radioactive phosphorus.

Core of the Reactor

[AL-MUSAWWAR] How are the neutrons generated?

[Dr Sultan] The neutrons are generated as a result of a chain reaction in the reactor's core from splitting uranium, which is normally uranium 235 and 238. The uranium present in the reactor is the very heart of the reactor. It consists of a certain number of fuel units. When the reactor reaches the critical point, the reaction begins and neutrons are emitted.

[AL-MUSAWWAR] What is the present capacity of the reactor?

[Dr Sultan] Its capacity is 2 megawatts. We plan to construct a reactor of higher capacity within the Nuclear Research Center.

[AL-MUSAWWAR] Does the reactor operate continuously?

[Dr Sultan] It does not operate continuously, but only on days determined according to the needs of researchers. Thus, it may operate twice a month, or more. The period of operation is usually 48 or 72 hours—or according to needs.

International Agency

[AL-MUSAWWAR] How does inspection by the International [Atomic Energy] Agency take place?

[Dr Sultan] Usually, the International Agency inspects the nuclear materials and ascertains that they are not being used for other purposes. The reactor is inspected every year. Our reports are good, without any comments.

Accompanied by Dr Sultan and a few members of the center, we moved to the reactor. A visitor's every step must be observed and known. At the entrance of the reactor building, each of us put on a white coat with a measurement device and radiation detector attached to its lapel. I had already learned that it was a working day for the reactor, and so I felt a certain fear as soon as my feet crossed the entrance of the reactor building. From the very first, we were accompanied by another representative. He carried in his hand another radiation measurement device. I asked him, "Are we walking inside the critical zone now?" He said that there was no danger in this area. We reached the office of Dr 'Inayat 'Awad Sa'd, head of the reactors division. She offered us some chocolates. I hesitated to take them, until I was assured that they were free of radiation and that the office areas where reactor scientists sat were far from the danger of radiation.

A discussion began. In addition to Dr Sultan, a group of other scientists with rare expertise participated with us. They included Dr Muhammad Khurshid, head of the reactor and neutron physics department; Dr Amal Niquila Hanna, head of the protection group; Dr Nabil Muhammad 'Abd-al-Fattah, from the computer group; and Dr Fawzi Hakim Dimitri, from the control group.

During the discussion, we had before us a television screen explaining the reactor's method of operation and its composition. In every office there is a similar screen connected to the control room.

10 Tubes

Dr 'Inayat 'Awad Sa'd began: "In our research, we concentrate on applied experiments that serve practical fields, whether hospitals or universities." We saw from an architectural drawing, as well as what appeared on the television screen, that there are 10 horizontal tubes that emerge from the body of the reactor for conducting scientific experiments. Each experiment is conducted in front of one of the ten tubes in which a stream of neutrons is travelling. This is in addition to a number of vertical tubes for irradiating specimens belonging to the universities in the field of nuclear physics or for irradiating isotope specimens for use in various fields, medicine being the most important.

Dr Muhammad Khurshid spoke in some detail. He said that the reactor is used in two fields: nuclear physics and the physics of solids (the study of the properties of certain materials used in industry). In addition, research is carried out on new materials, such as superconductors, for which the world is now searching.

Dr Muhammad Khurshid added that each experiment takes place in front of a horizontal tube with the approval of a group of researchers. We asked about the experiment that was located in front of the reactor at the time of our visit. He said that an experiment was being conducted to choose the concrete material needed for building reactor bodies. Neutrons were being focused on the concrete sample to determine its properties and endurance.

Returning to the conversation, Dr 'Inayat said that the economics of nuclear research are a very costly operation. The government must therefore provide the required expenditure for it.

Moving the conversation to another point, Dr Khurshid said that a new reactor must be procured, since the present reactor had reached the end of its assumed lifetime. "Reactors like the one we have, in terms of capacity, should be scrapped. This does not mean that we are not operating; we operate within the limits of what we have."

Dr 'Inayat added that a new reactor is needed because there are experiments that require greater capacities. The present reactor began operating in July 1961. Its capacity was supposed to have been increased in 1965 from 2 megawatts to 5 megawatts.

Dr Sultan intervened to say that through the expertise of these scientists, the current reactor had been renovated so that it could operate for years. "We are in the process of obtaining a new, high-capacity reactor. Nevertheless, this reactor will continue operating."

Automatic Control Room

Leaving the office, we began touring the reactor's operating equipment. Dr Amal Niquila Hanna, head of the protection group, accompanied us with a radiation measuring device. Dr 'Inayat 'Awad Sa'd, head of the reactors division, also came. We went to the automatic control room, where the operation of the reactor is initiated, followed, and stopped. Inside the room, we saw two kinds of equipment: the first is old and Russian, the other modern. Dr Fawzi Hakim explained; it is indeed modern and came in the context of replacing and renovating certain parts of the reactor.

We asked Dr Sultan to explain to us a working day in the reactor. He said that first the cooling circuits and pumps are turned on, then the ventilation circuits for the entire building, the reactor, and the reactor core. Then the radiation monitoring devices are turned on and perform certain tests.

Next, the operating crew turns on the reactor itself. This consists of a group of fuel baskets and control rods. Next, the core of the reactor reaches the right temperature (40 degrees centigrade). Generating capacity is then raised as required.

Completing the picture, Dr Fawzi Dimitri said that there are nine control rods. Three are safety rods; four are for hand operation. Their position changes the reactor's capacity. There is also an automatic operation rod that automatically adjusts capacity.

As a rule, the operating rods are in the highest position. If any break-down occurs, requiring a halt to operation, the rods descend automatically and reactor's operation stops.

If Capacity Were To Increase

We asked about the reactor's highest capacity of neutrons. Dr [Dimitri] said that it is 13.90 [figure illegible] neutrons. He added that if the power increased 20 percent above the current maximum, the reactor's internal materials would fuse and no radiation would escape to the outside.

Afterwards, we asked to enter the reactor chamber. Dr Amal Niquila gave the answer. "There would be difficulty and danger if you entered the reactor chamber, especially since it is operating." But we insisted on seeing the reactor and having my colleague take the required pictures. Faced with this insistence, Dr Amal and Dr 'Inayat agreed on our entering the reactor chamber from the upper story, but only for a limited time, no more than

minutes, or even seconds. We entered the reactor chamber. A state of fear did indeed overcome me, since radiation penetrates the body invisibly. We stayed more than the allotted time.

While Dr Amal watched the radiation measuring device, Dr 'Inayat watched the clock. Each of them was some distance away. While we were high in the reactor chamber, there was a researcher on the ground floor of the chamber. We asked him why he was present during the reactor's operation. Dr Amal said that he entered only by permission for a certain limited time to set up his experiment. Normally, a designated official has the key to the reactor chamber and opens it only by prearranged permission and for weighty reasons.

While we were in the chamber, we saw the reactor. It is a cylindrical body from which horizontal tubes emerge. Those which are not operating are blocked by plates of paraffin wax to absorb neutrons.

We descended to the first floor where the entrance to the ground floor of the reactor chamber is located. On the way to the door of the reactor chamber there is a radiation measuring device for anyone entering or leaving. I entered the device to find out the amount of radiation that had reached me. The device showed that it was insignificant. Muhammad Ahmad al-Maghribi, from the reactor protection group, said that no one can enter or leave the reactor chamber without passing through this device.

What Are Your Comments?

I ended my tour of the reactor with a meeting with Dr Hamid Rushdi, head of the Nuclear Power Agency, who happened to be present that day. Instead of me questioning him, he questioned me: "What are your comments?"

I said, "I have seen that Egypt has specialists capable of carrying out any nuclear operation in civil or strategic uses. To a large extent, I thought I would find the Nuclear Research Center and the reactor free of government bureaucracy." He asked me, "Did you notice the presence of any foreign expert in this center?"

"No," I said, "I found no foreign expert; they were all Egyptian scientists."

"This," he said, "is one of the important achievements of the Egyptian scientists who undertook to maintain and restore the reactor to operation after 1973. Most importantly, no accident has occurred within the reactor since it commenced operation in 1961."

I agreed with Dr Hamid Rushdi that we would finish the conversation in the agency's building on Qasr al-'Ayni Street. That is where we, in fact, met and talked.

Dr Hamid said that from 1955 to 1967, the focus was on preparing the foundation structure of nuclear technology and at the same time on preparing personnel. In the midst of this, the nuclear reactor and the Nuclear Research Center were built.

From 1967 to 1973, atomic power projects were frozen because of the circumstances through which Egypt was passing. Also frozen was the construction of a powerful reactor project to produce electricity, a project which had been proposed in 1964.

During this period, a decision was again made to stop operating the reactor so as not to be exposed to a strike from Israel. With Egyptian expertise, the core of the reactor was removed and the fuel was stored. This was completed within a single week.

From 1973 to 1986, the Atomic Energy Agency took charge again. The focus was basically on productive applications of radioactive sources. In 1977, the government became convinced of the importance of supporting nuclear activities. It established the Nuclear Materials Agency to prospect and search for nuclear raw materials and the Nuclear Power Plant Agency to generate electricity.

In 1981, the Atomic Power Agency formed an agency for nuclear regulation and safety with the aim of raising inspection capacity, following up safety standards in nuclear establishments, and reviewing safety specifications of electrical power generating reactors as they were built.

In 1981, the Atomic Power Agency built the "hot plant" to treat radioactive wastes at the national level, along with the by-products of nuclear fuel, and to establish burial sites for treated by-products.

Radiation Survey

From 1986 to the present, because of the Chernobyl accident, the agency has espoused the protection of the Egyptian environment from the dangers of radiation. This involves a radiation survey of those coming from abroad; of the bodies of ships, airplanes, and personal baggage; and of environmental masses in Egypt, such as water, air, soil, plants, animals, and people.

In addition, an operations room has been established to survey imported food. Consideration has been given to establishing a national radiation observation network, with the aim of establishing observation stations covering all of Egypt and its territorial waters. Bids for this network have been invited, and it is expected to begin in a year.

The important thing is to move from the stage of cadre preparation and training to the stage of nuclear production. That is to say, the agency has begun to fabricate

some components of nuclear equipment in order to break the roadblock of monopoly or the threats that any developing nation encounters.

Dr Hamid Rushdi added, "We can manufacture heavy water at the degrees of purity required by the nuclear industry."

In the field of nuclear industry, various manufacturing sites and the agency cooperate to achieve this goal.

Raising Capacity

Regarding the present reactor, Dr Hamid said that it still permits many activities. Consideration has therefore begun to be given to raising its capacity from 2 to 7 megawatts. We have begun discussions with a number of parties with expertise in this kind of reactor to assist the agency in this.

Furthermore, the current plan includes the building of a new reactor with greater capacity in order to enter into fields that support the project of constructing nuclear electricity generating plants. An initial capacity has been set at between 15 and 20 megawatts. Specifications for it have been set. The participation of a high proportion of Egyptian cadres in its construction and operation has been stipulated. The stage of constructing this reactor is considered the definitive answer on the ability of Egyptian experts to deal by themselves with advanced nuclear technology. The new reactor will be built in Inshas, next to the old reactor.

Returning again to the nuclear industry, we find that Dr Layla Fikri Fu'ad, head of the engineering department at the Nuclear Research Center, stresses that nuclear measuring devices are designed and manufactured with Egyptian expertise and according to the most modern technology.

Since a nuclear industry that aims at breaking the monopoly can mature only if we have nuclear fuel, particularly uranium, I met with Dr Husayn 'Abd-al-Muhsin, head of the Nuclear Materials Agency.

Dr Husayn said, "We must be self-reliant in nuclear fuel—uranium—in order to embark upon any serious nuclear program, particularly since uranium, unlike other metals, is not a commodity that circulates in the free market. It is a strategic material whose purchase is affected by political factors.

"Faced with this reality, we have concluded that quantities of uranium exist in certain places that were included in the radiological survey, which took in an estimated 40 percent of the area of the republic."

Predicted Reserve

He added that in light of the indicators that have been discovered to date, between 10,000-15,000 tons of uranium may be present as a predicted reserve in these areas.

Dr Taha Siyam, deputy chairman of the Nuclear Materials Agency, said that mines have been established in some uranium-rich areas using local resources. Actual exploitation requires the provision of necessary funding or the finding of a foreign partner.

Until funding can be found for uranium mining, the current proposal is to extract uranium from the phosphoric acid produced by the Abu Za'bal Fertilizer Company at rate of 15 to 20 tons a year—increasing with the increased production of phosphoric acid, as Dr Husayn 'Abd-al-Muhsin says. The plant of the Abu Za'bal Fertilizer Company has a production capacity of about 70,000 tons of phosphorus pentoxide, i.e., a daily production of 20 tons, as a result of the processing of 250,000 tons of raw phosphate a year.

Given the ratio of uranium, which averages about 60 grams per ton, the amount of uranium that can be extracted a year is about 15 tons—or 30 tons of uranium a year, if, as predicted, the technical study of the operation of the uranium production line at the Abu Za'bal Fertilizer Company is completed. This would be the first attempt to produce uranium locally.

Dr Taha Siyam said that if production at Abu Za'bal begins now, it will be possible for us to store large quantities of uranium within 10 years for power reactors, if the government moves in that direction.

Until a decision is reached on constructing nuclear [power] plants, we can say that with the construction of the new nuclear reactor in Inshas and the raising of the capacity of the present reactor, it will be possible for us to have a nuclear industry as well as the nuclear fuel to guarantee the requirements of these reactors.

[Box, p 41]

New Research Reactor To Operate in 1994

After finishing my tour, I met with Engineer Mahir Abazah, minister of electricity and power.

[AL-MUSAWWAR] When will the power of the present research reactor be increased?

[Abazah] In general, there is something of a limitation on investments for the Research [Center's] new 20-(karat) reactor. Economic conditions are forcing the government to award investments to priorities. As a result, there is a shortage of investments in certain sectors. Nevertheless, we are trying hard and are in touch with planning. We are trying to increase investments. As

regards uranium, we have not waited for the exploitation of the mines that have been discovered. Instead, we have initiated contact with the Ministry of Industry to extract uranium from phosphoric acid at the Abu Za'bal fertilizer plant. As regards mining in the discovered areas, we are now studying bringing in foreign companies to mine the uranium on a system of splitting the production, as happens in the petroleum and natural gas extraction sector. The Nuclear Materials Agency is studying the areas that can be awarded to international companies to mine uranium under Egyptian surveillance and with a larger share for Egypt. In this way, we will provide additional investments.

[AL-MUSAWWAR] Specifications of the Research [Center's] new 20-(karat) reactor are now being set. When will work on it begin?

[Abazah] The function of the Research [Center's] new reactor will be research. We are advancing in the research area and thus cannot cut the link of research development. This demands that we build a bigger reactor than the present 2-megawatt Russian reactor. We have received approval on this from the Policies Committee and the Council of Ministers. Specifications have been set, preliminary to inviting bids. In operations of this kind there is usually a certain amount of aid from some countries, in addition to loans on favorable terms. I expect construction of the Research [Center's] new 20-(karat) reactor to be completed within 4 years. I expect this reactor to be ready in 1994 and to work in completing research on power for peaceful purposes.

[AL-MUSAWWAR] On the basis of my tour, and despite my having seen that Egypt is full of human talent, nuclear technology still needs a greater impetus. What is your opinion?

[Abazah] We have given and are continuing to give greater impetus to peaceful nuclear technology. For example, we now have a small unit to produce nuclear fuel in Inshas, as well as the "hot plant" and the food irradiation plant in Madinat Nasr. I would like to say that atomic power has entered practical fields, not only research fields. This has occurred in industry, agriculture, health, and petroleum. We see grain and fruit being irradiated so that they have a long life. The fruit fly is being combated by being sterilized by radiation, and there is transplantation with irradiation.

[AL-MUSAWWAR] Have we begun to produce heavy water?

[Abazah] At the laboratory level it has been possible to produce heavy water. But if the government approves the nuclear program for generating electricity, we shall be able to construct heavy-water reactors and others with ordinary water. In that case, it will be possible to manufacture some parts of these reactors in Egypt in addition to the uranium, and it will be possible to produce heavy water in some Egyptian factories.

[AL-MUSAWWAR] Does this mean that we will not embark on a nuclear industry in the true sense of the word, unless the government approves the nuclear program?

[Abazah] As regards the nuclear program for generating electricity, we cannot begin. However, we are proceeding on producing what is necessary for the reactor and certain applied laboratories.

[AL-MUSAWWAR] Has the nuclear program been approved?

[Abazah] It has not been approved to date.

[AL-MUSAWWAR] In what context is nuclear development proceeding?

[Abazah] We are developing only in a peaceful context.

INDIA

Ballistic Missile Test Postponed Until May
BK2304151589 Hong Kong AFP in English
1504 GMT 23 Apr 89

[Text] New Delhi, April 23 (AFP)—Indian defence experts have postponed the launch of the country's first ballistic missile until May after aborting the blast-off four times since Thursday, reports said here Sunday.

Defence scientists have decided to test-fire the intermediate range ballistic missile (IRBM) called Agni (Fire) sometime within the first two weeks of next month, the PRESS TRUST OF INDIA (PTI) said. The exact date of the test-firing would be notified three days before the launch, PTI quoted officials at the launch pad in eastern Orissa State as saying.

"We would launch the missile when it could give us the best of results," a top technological advisor to the Indian Government told AGENCE FRANCE-PRESSE in New Delhi. There is absolutely nothing wrong with Agni but we would launch it only when we are satisfied it would give a 100 percent data feedback instead of, say, 95 percent," the official said. "Otherwise there is no point in firing it," he said, adding that the missile launch was planned as a "technological demonstration and not to make an impression."

The Defence Ministry has said the launch of its IRBM was aimed at testing its "control and guidance systems" and did not amount to induction of a weapon. Defence experts on the last moments of the final countdown abandoned Thursday's launch of the domestically built missile and postponed it again on Friday, Saturday, and

Sunday following unspecified technical snags. The official denied news reports that the launch has been temporarily abandoned because of technical snags in Agni's ignition system or that anti-missile protesters had sabotaged power connections to the launch pad in Orissa State.

"All this (publicity) is very embarrassing for India," the official added.

The IRBM, which has a flight range of 2,500 km (1,560 miles) and can be armed with nuclear warheads or launch civilian satellites, is to be test-fired from Chandipur, 150 km (90 miles) southwest from Calcutta. Agni is targeted to land in the Bay of Bengal between Sri Lanka and India's Andaman Islands. The target zone has been declared off-limits to fishing vessels and merchant ships. Civilian aircraft have been banned from flying over Agni's scheduled flight-path.

India successfully test-fired a domestically built tactical missile called Prithvi (Earth), which has a range of 250 km (155 miles), on February 25, 1988. But the country's civilian space programme suffered a setback five months later when an augmented satellite launch vehicle crashed into the Bay of Bengal 150 seconds after take-off.

Agni Missile Test 'Should Not Cause Any Concern'

BK1704160089 Delhi Domestic Service in English
1530 GMT 17 Apr 89

[Text] An External Affairs Ministry spokesman asserted in New Delhi today that the proposed test-firing of an Agni missile is a demonstration of the technology which India wishes to develop.

Responding to queries from newsmen, he said it is an integrated guided missile program, which is indigenous, for meeting some of the operational requirements of defense services. It does not amount to introduction of a weapon system. He said it should not cause any concern to anyone.

Paper Urges Missile Test Despite U.S. 'Advice'

BK2304083989 Delhi THE HINDUSTAN TIMES in English 17 Apr 89 p 11

[Editorial: "Go Ahead With Agni"]

[Text] U.S. Democratic Senator Jeff Bingaman has been less than fair to India in advising it to desist from the proposed testing of the Agni missile. His concern is unexceptionable; he feels that India's stature as a peaceful world leader would be damaged if it perfected a missile with a 2,500-km range. Mr Bingaman's sentiments for India's reputation are worthy of respect. What is less easy to comprehend is his reasoning. He believes India's relations with China would be damaged since several major Chinese cities would be within the range of Agni.

Of equal concern to him is the likelihood of the Indian missile programme triggering an arms race with Pakistan at the cost of friendly relations between them. Although India has been traditionally denigrated by Americans for what they call its self-righteousness, historically it can be contested that there never has been a dearth of matching homilies from the United States. Unfortunately, Mr Bingaman's advice falls in this category, and is apt to be taken as counsel designed to thwart India's efforts at self-reliance. Such efforts do not end with a green revolution, a liberalised industrial policy, and an extra-receptive ear to the World Bank-IMF pundits.

Successive Indian leadership has nurtured the notion that self-reliance extends beyond economic endeavour and, in fact, hinges on a quantum jump in the development of science and technology. What is surprising is that U.S. leaders do not seem to grudge China the right to work for scientific advances. Beijing's nuclear and space programme is in perfect order; its missiles can be trained on Indian cities, and East Wind could travel to Saudi Arabia and Silkworms to the warring nations in the Persian Gulf. But India must be prevented from devising a defence system against possible Chinese attack. This is not sound logic.

Mr Bingaman's views might not have received serious notice had there not been a lurking suspicion that he might not be quite unrepresentative of official U.S. thinking. In any case, a report that Vice President Dan Quayle prepared last year, six months before he was picked up by Mr George Bush as his running mate in the Presidential election, is revealing. The thrust of Mr Quayle's report is to evolve a strategy to thwart the attempts of a number of Third World countries, including India, from acquiring missile capability.

Security and defence matters are among Mr Quayle's areas of specialisation, and it will be surprising if his expertise goes entirely unused by the U.S. administration. And, because of this possibility, India should be wary of gratuitous advice, such as has come from Mr Bingaman. The unrelenting pressure on India for restricting its nuclear and space research betrays a distressing degree of mistrust in this country's sense of responsibility. It is unfortunate, but not strong enough reason for India's decisionmakers to feel inhibited. They should go ahead with the Agni missile programme.

Soviet Pressure To Sign Nuclear Treaty Examined

BK2504094989 Calcutta ANANDA BAZAR PATRIKA in Bengali 9 Apr 89 p 1

[Article by Kuldip Nayar]

[Text] New Delhi, 8 April—It has been learned that the Soviet Union has been exerting pressure on India to sign the Nuclear Nonproliferation Treaty (NPT), a move that would open India's nuclear research centers to international inspection. Nearly 100 countries have already

signed the treaty and attempts to incite India in that group have continued for a long time. However, this is not the first such Soviet pressure on India.

The Soviet Union is supplying two nuclear reactors to India which will operate entirely under Soviet supervision. Moscow believes that if India agrees to allow inspections of the two reactors, then it should not have any reason to refuse similar inspections of its other nuclear centers.

Washington has continuously pressed New Delhi to sign the NPT, but with little effect. It has been consistently rejected by India. Her position is that in view of the refusal of the five nuclear club countries—the United States, the Soviet Union, the United Kingdom, France, and China—to sign the treaty, it is absurd to assume that other countries, who have reached or are on the verge of reaching nuclear capability, will sign it.

Moscow's current attempt seems to enjoy U.S. backing. They probably believe that since India maintains closer links with the Soviet Union, pressure by the latter might help in achieving the objective. Washington is also concerned about Pakistan's reported nuclear capability. Pakistan has hinted that it will sign the treaty if India does.

During the first few months after assuming office, Prime Minister Rajiv Gandhi expressed his interest in signing the treaty. He then directed the External Affairs Ministry to examine the pros and cons of signing the treaty. Eventually, however, he followed in the footsteps of Jawahar Lal Nehru and Indira Gandhi and decided not to proceed in this regard, because Rajiv Gandhi also disliked the unfair privileges granted to the nuclear club countries.

The main reason behind India's refusal to sign the NPT is India's neighbor—China. Being a member of the nuclear club, China has not been asked to sign the treaty. In the event of both China and Pakistan signing the NPT, India would probably have no more objections to signing it as well.

Under the present circumstances, India is not likely to bow to Moscow's pressure. India thinks China should also be included in the group signing the treaty.

It is difficult to guess whether Nehru would have gone for a nuclear test as Indira Gandhi did. Nehru was against all types of nuclear tests, underground or otherwise. However, he supported the nuclear research development program. India exploded a nuclear device during Indira Gandhi's tenure and the question of whether it was really of a peaceful nature remains an internationally-debated issue.

Energy Agency Receives 15 Tons of Heavy Water
AU2004184789 Paris AFP in English
1711 GMT 20 Apr 89

[Text] Oslo, April 20 (AFP)—India's Atomic Energy Agency was the recipient of 15 tons of heavy water, shipped from Norway to West Germany in 1983, and diverted to Bombay by way of Zurich and Dubayy, Norwegian Radio reported Thursday.

A spokeswoman for Norway's Ministry of Foreign Affairs confirmed that the recipient in Bombay had been traced, but would not give names.

The radio news report said that documents showed the recipient to be the Directorate of Purchase and Storage in Bombay, which the report claims is a branch of the Indian Atomic Energy Commission.

The shipment was originally bought by West German businessman Alfred Henipel for use in West Germany, but was illegally diverted to India. India, who has not signed the Nuclear Non-Proliferation Treaty, cannot under international regulations buy more than one ton of heavy water annually. Heavy water is a key ingredient in the production of plutonium, which is used in atomic bombs.

The Ministry of Foreign Affairs said it might ask Indian police for assistance in investigating the matter.

Madras Scientists Observe Room Temperature Fusion

BK2604055389 Delhi Doordarshan Television Network
in English 1600 GMT 23 Apr 89

[Text] Nuclear fusion is a process in which two atoms combine and release a vast amount of energy. This takes place only at extremely high temperature. In fact, the sunlight that we get is a result of the process. But recently Mr Stanley Pons of the University of Utah and Mr Martin Fleischmann of the University of Southampton caused a sensation by claiming that they had achieved fusion at room temperature. The latest to do so are scientists of the Indira Gandhi Center for Atomic Research at Kalpakkam, Madras.

Scientists at the Indira Gandhi Center for Atomic Research at Kalpakkam near Madras have observed fusion in an electrolytic cell containing heavy water. Heavy water is made of oxygen and (deuterium ?atoms). The latter released by electrolysis of heavy water are supposed to fuse releasing energy and emitting a neutronous byproduct. The reaction occurs in room temperature and is hence called cold fusion. We have observed neutrons coming out of the cell, said the director of the center. Dr C.V. Sundaram.

[Begin Sundaram recording] One square kilometer of the sea near us can provide enough heavy water to generate fusion energy (which can) meet our electricity needs for the entire country for a period of a couple of years. [end recording]

The scientists claimed that there was a 30 percent increase in neutrons over the background level, suggesting that fusion was taking place. The results were preliminary and further work is going on.

Nuclear Material Export to Pakistan Investigated
BK2604161189 Delhi Domestic Service in English
1530 GMT 26 Apr 89

[Text] India is ascertaining whether some nuclear material sold to a West German company has been reexported to Pakistan as reported in a section of the press. An official spokesman said in New Delhi today that the nuclear fuel complex of Hyderabad had sent a small quantity of (Zirco)-alloy cubes to the German company. While purchasing the material, the company had assured the government that the material will be used for some tests and it will not be resold to any other country. The spokesman said if the material had been passed on to Pakistan, it is a breach of contract by the West German company.

Concern Expressed Over Pakistani Nuclear Program

BK1704161989 Delhi Domestic Service
in English 1530 GMT 17 Apr 89

[Text] India has expressed concern at Pakistan's weapons-oriented nuclear program and its ongoing military buildup in its quest to achieve qualitative advantage in the region. The annual report of the Defense Ministry for 1988-89 says that the Indian Government views with concern reports about Pakistan's growing security linkages with the U.S. Central Command and also with its erstwhile CENTO [Central Treaty Organization] partners.

It points out that apart from acquiring high-technology weapon system from the United States and other Western sources, Pakistan has brought about significant upgradation of its existing weaponry in collaboration with China and other countries.

The report observes that India has been compelled to focus attention on antisubmarine defense following Pakistan's recent acquisition of 100-km-range naval missile which poses a potential threat to India's on-shore and off-shore installations.

The report however notes that the emergence of a democratically-elected government in Pakistan is another event of importance, justifying cautious optimism for improved and more enduring relationship between India and Pakistan.

The annual report warns that China's policy of arms supply to countries of southern Asia has the potential to adversely affect the security environment in the region. However, it says, these developments may be viewed in the overall perspective of other positive trends toward improving India-China relation and the resolve of both the countries to maintain peace and good-neighborly conduct.

IRAN

Defense Industries Manufacture New Missile
LD1704154189 Tehran IRNA in English
1535 GMT 17 Apr 89

[Text] Tehran, April 17 (IRN/)-A new surface-to-surface missile with a range of 200 km has been manufactured by defence industries organisation said an official here today. He said, during the 10 years since the victory of the Islamic revolution the organisation has added 153 types of new weapons to its product line.

In addition to this new missile, the organisation has manufactured Oqab (Eagle), Shahin (Falcon)-1 and Shahin-2 missiles. The organisation also repairs F-4 and F-14 fighters as well as Falcon jets besides overhauling boeing 747s and 707s he said.

The organisation has established a science and defence industries academy in Esfahan which will admit 700 students this year.

Nuclear Weapons Program Reportedly Started
NC2104140789 Cairo MEKA in English
1340 GMT 21 Apr 89

[Text] Kuwait, April 21 (MENA)-Iran has started implementation of a nuclear programme aimed at producing the fuel required for the production of atomic weapons, according to Kuwaiti newspaper "AL-QA-BAS" today.

Quoting diplomatic sources in Japan, the newspaper said that Iran purchased from Japanese markets during 1987 a large quantity of materials needed for the production of atomic weapons. It added that Iran was also seeking nuclear technology and expertise while trying to keep its programme in secrecy.

FRG Diplomat Receives Protest About Aid to Iraq
LD2404205989 Tehran Domestic Service in Persian
1630 GMT 24 Apr 89

[Text] This morning the West German charge d'affaires in Tehran was summoned to the Ministry of Foreign Affairs where he received a severe protest about the active participation of West German companies in the production of medium-range missiles with chemical or nuclear warheads in Iraq, and manufacturing and sending chemical weapons to Iraq.

The Central News Unit reports that at this meeting the head of the first bureau for Western Europe presented evidence and documents pointing to the active role and cooperation of German companies with the Iraqi regime in the past 4 years in manufacturing missiles capable of carrying chemicals and nuclear warheads. He also noted the hostile position taken by the German Government in the past few months and officially informed him of the government of the Islamic Republic of Iran's decision to reduce its economic relations with West Germany.

The FRG charge d'affaires responded, saying: The policy of the West German Government is to maintain its friendly relations with Iran. About the blasphemous book "The Satanic Verses," he said: This book has insulted one of the world's greatest religions and has disrupted our position and relations to a major degree. We are aware that the person who has insulted Islam's prophet is a blasphemer and that according to your Islamic belief he deserves to die.

Following an invitation extended by the FRG deputy foreign minister, the head of European and U.S. affairs at the Ministry of Foreign Affairs left for that country heading a political delegation this morning. He will try to strengthen the friendly relations and exchange views on mutual cooperation.

IRAQ

Official Denies Nuclear Cooperation with Egypt

JN2404164589 Cairo AL-AHRAM in Arabic
23 Apr 89 p 1

[Article by Mahmud Murad]

[Text] Baghdad—Lieutenant General Dr 'Amir al-Sa'di, first undersecretary of the Iraqi Ministry of Industry and Military Industrialization, has denied the existence of any cooperation between Egypt and Iraq in the field of nuclear defense or the manufacture of chemicals. He said that these are rumors circulated by Western circles against the two countries.

Li Gen al-Sa'di praised the military cooperation between Egypt and Iraq. He said this cooperation is deep-rooted and pointed out that contacts exist between Egyptian and Iraqi military factories.

In a related development, Eng Jamal al-Sayyid, minister of state for war production, and Li Gen Ibrahim al-'Urabi, head of the Arab Military Industries Organization, will arrive in Baghdad on Thursday to attend the opening of the Baghdad International Fair for Military Industries, which will open on Friday and last until 2 May.

Egypt will take part in the fair with the products of 17 companies, which will display their products of tanks, aircraft, guns, and rockets.

Armitage Statement on Missiles Criticized

JN2004124889 Baghdad INA in Arabic
1030 GMT 20 Apr 89

[Text] Baghdad, 20 Apr (INA)—The INA Arab affairs editor has said that a careful study of U.S. policy shows that it is based on the principle of always putting U.S. interests in the Arab region first and on its readiness to use force to maintain these interests.

The editor was commenting today on recent statements by Richard Armitage, U.S. assistant secretary of defense for international security affairs, in which he said that the United States and Israel have a common problem in confronting surface-to-surface missiles and that their cooperation in the Strategic Defense Initiative is intended to solve this problem. The editor said that this statement is part of the hostile campaign against Iraq and the Arab nation, aimed at depriving them of advanced technology.

The U.S. official's statement also emphasizes that U.S. policy continues to be preoccupied with the Arab region. This is reflected in its continuous assertion of a commitment to protecting Israel's security and ensuring its interests in the Arab region and the Middle East.

He said that the U.S. official's statement entails reassessment of the U.S. interests in the region, which are based on broad principles, foremost of which is the creation of the Zionist entity in the land of Palestine. This entity has full U.S. backing and is linked to the other hostile plans.

He said that Armitage's statement, coming at this particular time, is aimed at giving the Zionist entity a new opportunity to achieve superiority over the Arab nation, so that it can consecrate its occupation of the Arab land and continue its aggression.

The editor pointed out that the U.S. official's statement that "Israel has agreed to cooperate with us in the Strategic Defense Initiative" fully reflects the joint plan of both sides and their hostile intentions of occupation and aggression.

The INA Arab affairs editor warned that this cooperation may herald a premeditated act of Zionist aggression, with U.S. encouragement, against the Arab nation under various pretexts and media statements being floated here and there. He said that Iraq and the Arab nation can only strongly retaliate for any such intentions and in the way they deem appropriate.

He pointed out that Armitage's statements are also designed to further U.S. attempts to rescue the Zionist entity from the historic crisis brought upon it by the escalating intifadah (uprising) in the occupied territories and the Iraqi victory against Iranian aggression, which gave true impetus to this valiant intifadah.

Zone Free of Nuclear, Chemical Weapons Urged

JN1904124289 Baghdad INA in Arabic
0800 GMT 19 Apr 89

[Excerpt] Geneva, 19 Apr (INA)—Iraq has called for declaring the Middle East a zone free of nuclear and chemical weapons [CW] and other weapons of mass destruction, with the condition that all parties in the region, including the Zionist entity, should sign the effective treaties such as the Nuclear Nonproliferation Treaty.

In a speech last night before the first ordinary session of the disarmament conference of 1989, currently being held here, Rahim 'Abd al-Katl, head of the Iraqi delegation, said that the objective of nuclear disarmament is to reinforce world peace and security.

He added that the results of the disarmament process should not benefit a single state or a group of states at the expense of other states. He said that all states should enjoy security at all times.

Al-Katl stressed that the special nature of every region in the world must be taken into consideration when measures of disarmament are adopted so that these measures will be simultaneous and cover all weapons of mass destruction. [passage omitted]

PAKISTAN

Report on Closure of Kahuta Nuclear Plant Denied

BK1804152189 Islamabad Domestic Service in Urdu
1500 GMT 18 Apr 89

[Text] A federal government spokesman said in Islamabad today that the Kahuta [nuclear] plant is functioning as usual. He denied a report published in a section of the press that the government has ordered a closure of the plant at the behest of certain foreign governments.

More on Alleged Shutdown of Kahuta Nuclear Plant

BK1904022089 Hong Kong AFP in English
0004 GMT 19 Apr 89

[Text] Islamabad, April 19 (AFP)—The government of Prime Minister Benazir Bhutto has rejected as "baseless" the opposition's charge of ordering a closure of the country's major nuclear installation to allegedly appease the United States and India.

Iqbal Ahmad Khan, secretary-general of the former Prime Minister Mohammad Khan Junejo's Pakistan Muslim League, Monday [17 April] charged that Ms Bhutto had ordered the shutdown of the country's biggest uranium enrichment plant at Kahuta near here amid preparations for the prime minister's U.S. visit in June. Mr Khan claimed that the step was taken against the

advice of the defence planners in view of Washington's opposition to the country's controversial nuclear programme and India's allegations that Pakistan is going nuclear.

A government spokesman refuting the allegation here Tuesday described the report as "totally false and unfounded. The Kahuta plant is functioning normally," he said, adding that "it has nothing to do with the pleasure or displeasure of any foreign country." Its operation was not subject to the wishes of the defence planners, he stressed.

USSR Offers To Sell Reactor to Pakistan

W11504090289 Paris AFP in English
0654 GMT 15 Apr 89

[Text] Tokyo, April 15 (AFP)—The Soviet Union has offered to sell a nuclear reactor to Pakistan, a leading Japanese newspaper reported Saturday.

The offer was made informally by Soviet Foreign Minister Eduard Shevardnadze during his February visit to Pakistan, the YOMIURI SHIMBUN quoted Pakistan's Atomic Energy Commission Chairman Munir Khan as saying in an interview during his current visit to Japan.

Pakistani Water and Power Minister Zafar Ali Shah will go to Moscow this month to discuss the Soviet conditions for the sale of a reactor, the paper quoted Mr. Khan as saying.

Mr. Shevardnadze had not mentioned the conditions of the sale, it said.

Mr. Khan commented that it was ironic that Moscow, which has been at odds with Pakistan over the Afghanistan conflict, had made such an offer, the paper said.

It quoted him as saying that Pakistan had no intention of having nuclear weapons and that nuclear power development in his country was solely aimed at economic progress.

Mr. Khan recalled that Pakistan contracted to purchase a nuclear fuel reprocessing plant from France in the 1970's but France unilaterally scrapped the contract.

He added that Pakistan had no plan to buy a reprocessing plant, which could be used to produce fuel for nuclear weapons.

Paper Welcomes U.S. Position on Nuclear Issue

BK2204121489 Karachi DAWN in English
16 Apr 89 p 7

[Editorial: "U.S. Aid: New Perception"]

[Text] The latest official U.S. position on the nuclear issue in South Asia speaks of a greater sense of realism on the subject on the part of Washington. A senior State

Department official, in a testimony prepared for the House of Representatives Appropriations Subcommittee, has affirmed that the United States must rely on persuasion rather than restrictions on aid to prevent nuclear proliferation.

In the light of misgivings prevailing in certain circles about Pakistan's peaceful nuclear programme, this perception seems to imply a sympathetic approach towards Islamabad's principled stand which supports a regional initiative to complement global non-proliferation efforts. Unfortunately in the past Pakistan had been subjected to a motivated propaganda blitz designed to scuttle its attempts indigenously to manufacture or acquire nuclear power plants in order to solve an acute energy problem. The relevance of utilising this benign option is explained by the anticipated shortfall of 8,000 megawatts in the national grid by the turn of the century. Nuclear energy can greatly help to cover it.

Even in the face of threats of aid cut-off, Pakistan remained steadfastly committed to the peaceful uses of atomic energy and the prevention of nuclear proliferation. Embodying these commitments were several proposals made on the issue, including the establishment of a nuclear weapons-free zone in South Asia, a proposal which has been overwhelmingly endorsed by the UN General Assembly since 1974.

Similarly, Pakistan's offers to India of mutual inspection of each other's nuclear facilities and joint signing of the NPT [Nuclear Nonproliferation Treaty] are of a piece with efforts to keep South Asia free of nuclear weapons. Pakistan would not have persisted in these efforts if it had decided to become nuclear weapon state.

Despite the orchestrated campaign, Pakistan's strict adherence to the policy of non-proliferation had enabled the Reagan Administration annually to grant extension of the waiver to the Symington Amendment in order to allow the flow of American aid to Islamabad. It is rather encouraging that President Bush, recognising the additional merit of a democratic government in Pakistan and

its policy of developing nuclear technology for peaceful purposes, will be able to come out with the annual certification that Pakistan does not possess a nuclear explosive device.

As an earnest example of its consistent efforts to promote mutual cooperation in ensuring the application of nuclear energy for peaceful purposes and developing friendly and harmonious relations, Pakistan took the initiative to conclude the recent bilateral agreement with India about non-attack on each other's nuclear facilities and installations. In this context, the U.S. realisation that "it would be counterproductive to cut off assistance to Pakistan or impose additional non-proliferation restrictions on our aid" should prove helpful.

For it suggests that Pakistan's assurance about non-proliferation, coming as it does from a democratic government, is more credible and that steps for ensuring the application of nuclear energy to peaceful uses must be taken in a spirit of cooperation.

Prime Minister Benazir Bhutto's forthcoming visit to the United States, it is to be hoped, would contribute to a broadening of the possibilities of such cooperation and provide the necessary stimulus for the promotion of regional stability so vital to the prevention of nuclear proliferation.

Paper Says PRC To Sell Nuclear Power Plants

*BK2704140089 Hong Kong AFP in English
1341 GMT 27 Apr 89*

[Text] Karachi, Pakistan, April 27 (AFP)—Pakistan will buy three 300-megawatt nuclear power stations from China, a newspaper reported Thursday.

The Urdu-language daily JANG quoted informed sources as saying that an agreement was reached during Prime Minister Benazir Bhutto's visit to China in February. Installation will start by December, it said.

There was no official confirmation of the report.

The newspaper also said that Pakistan was negotiating with France, Romania and the Soviet Union to buy nine 900-megawatt nuclear power stations.

Proposal for Global IRBM Ban Welcomed
LD2004140189 Moscow TASS in English
1354 GMT 20 Apr 89

[Text] Moscow, April 20 (TASS)—The Soviet Union welcomes any ideas and proposals for reducing the risk of outbreak of nuclear war as well as dangers posed by other kinds of weaponry, Soviet Foreign Ministry spokesman Yuriy Gremitskikh said today.

It is important, however, that relevant accords be really effective and lead to a safer, nuclear-free world, he added.

Gremitskikh, first deputy chief of the Foreign Ministry's Information Directorate, was commenting at a news briefing here on a proposed global ban on intermediate- and shorter-range missiles patterned on the Soviet-U.S. INF treaty.

The idea has been suggested by Kenneth Adelman, former director of the U.S. Arms Control and Disarmament Agency.

A global INF ban is particularly important since the presence of intermediate- and shorter-range missiles in individual regions would have strategic implications and contradict recent positive trends in the field of arms control and disarmament, the Soviet spokesman said.

Uranium Plant Cutting Production After Health Crisis

51002426 Helsinki HELSINGIN SANOMAT in Finnish
15 Apr 89 p 33

[Article by Sole Lahtinen: "Hair Loss by Sillamae Children Keeps Estonian Health Officials Busy. Factory Reduces Uranium Production"]

[Text] The Soviet Union is reducing the output of uranium and certain other radioactive metals at the Sillamae plant in Estonia. The Soviet Union's third minister of health, Boris Spasskiy, discussed the subject on Friday in Tallinn. Spasskiy spoke at a seminar organized by the Estonian Ministry of Health in Toompea-mae.

About 60 experts from various fields, under the leadership of Minister of Health Laur Karu, pondered the causes for the mild symptoms, the most visible of which is loss of hair, noticed in children in the Sillamae area, which is located on the Gulf of Finland.

Western sources have hypothesized that components for nuclear weapons are produced in the Sillamae plant.

No one from the broad group of experts in Tallinn was able to give a final answer concerning the reasons for the Sillamae symptoms.

Automatic Radiation Measurements

The speakers included representatives not only of the biological sciences but also of the humanities. Was the illness caused by a virus, heavy metals, or some kind of stress?

Academician Emdel Lippmas, who spoke at the women's conference that opened on Friday, suggested that the symptoms were caused by radioactive radiation. A group of Estonian researchers, including Minister Karu and Academician Lippmas, carried out their own radiation measurements on Tuesday of this week in the city of Sillamae outside the plant area.

Next to the plant the radiation was one milliroentgen per hour. A few kilometers away, in the Sillamae kindergarten, the strength of the radiation was still 30 micrograms [as published; presumably microroentgens] per hour. According to Estonian estimates, normal radiation is 0.015 micrograms [as published] per hour.

According to reports, the symptoms appeared in the Sillamae children in January, but Estonians were told about these problems of the closed area only in March. About 100 children have had hair-loss symptoms.

Minister Spasskiy said at the seminar that the Soviet Union would shift the required radioactive metal production elsewhere.

The Estonian Republic representatives do not know precisely what the situation is now in Sillamae. The area is an industrial one that is affected by environmental problems in other ways, too.

Sillamae's neighbors include both the Kohtla-Jarve and Narva large industrial areas.

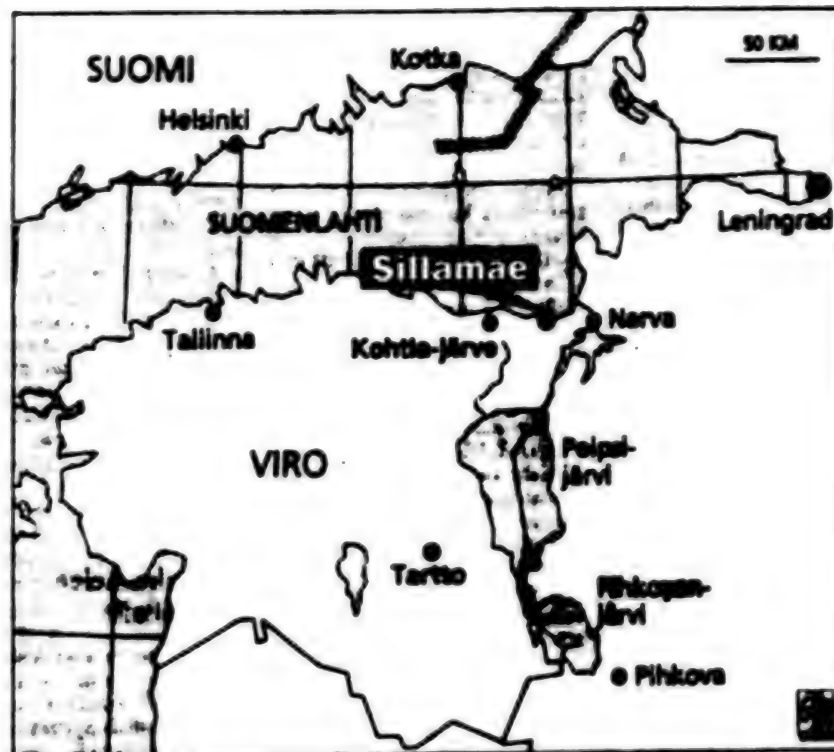
"We are telling you what we have been able to find out for ourselves," Minister of Health Karu told the press Friday evening.

'Higher Readings in Finland, Too'

The city of Sillamae has a population of about 20,000. The factory is the only large employer. It is believed to produce uranium, thorium, and loparite. Both radium and thorium form radioactive gas.

The factory was established in this area because there are radioactive minerals in the ground that are suitable for exploitation.

It has been conjectured that the naturally occurring radon gas would mix with the gas releases from the factory, so that positive information is not yet available. High radiation levels have also been detected elsewhere in Estonia, in the Narva, Kohtla-Jarve, and even the



Tartu areas. The official paper of the Estonian Komsomol, NOORTE HAAL, reported this week that radiation would also be higher than average in Finland near Sillamae, which is located on the shore of the Gulf of Finland.

Voronezh Nuclear Power Station Emissions 'Normal'

18220100 Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Apr 89 p 2

[Article by A. Pavlov: "Regular Repair"]

[Text] "Is it true that the AES [nuclear electric power station] has been shut down because of an accident?" "They say that atmospheric emissions from the nuclear plant exceed the norm..." Similar conversations are not rare in Voronezh these days. What happened at the country's first million-watt nuclear power station in Novovoronezh? Our correspondent A. Pavlov turned with these questions to V. Zverev, director of the AES. Here is what he said:

"There are no grounds for concern. Planned capital repair of the unit is going on. Every day defectoscopes 'travel' to the reactor's core and literally check every millimeter of welding. This kind of control is a guarantee of the power plant's reliable work.

"Now about those 'emissions' into the atmosphere. Observations by 32 observational dosimeter points are being conducted. There is also a control dosimeter post located 50 kilometers southeast of the AES, according to the prevailing winds. More than 20 years of observation show that radioactive contamination of the atmosphere is less than 8 percent of the accepted norm and is completely harmless to the population."

Lithuanian Ignalina Plant Suffers Accident

LD2104081289 Vilnius in Lithuanian to North America 0000 GMT 21 Apr 89

[Edvinas Butkus report]

[Text] Information about another accident at Ignalina Nuclear Electric Power Station [AES] was made public today.

At 0500 yesterday, following the failure of the hoisting device while the fuel rods were being recharged in the storage reservoir of the first power set, the rod dropped and made a hole in the floor of the reservoir. Water from the storage reservoir flowed into the tray of the reservoir and then to purification and processing equipment.

At 2130 the hole was repaired with the help of a special device. Further measures are being set up which, when put into operation, will fully prevent the escape of the water.

No pollutants have escaped into the environment.

This is the official text of the report which nevertheless enables some impression to be formed of the extent of the danger of this accident. This time I will restrain myself from making any comment on the state of affairs at Ignalina AES. I would just like to share my opinion that this accident will test people's patience to the limit.

U.S.-Soviet Study of Black Sea Radiation Completed

LD1804214189 Moscow TASS International Service
in Russian 0900 GMT 18 Apr 89

[Text] Kiev, 18 Apr (TASS)—Correspondent Mikhail Stesyuk reports:

The 2-week Black Sea expedition by Soviet and U.S. scientists aboard the research ship "Professor Vodyanitskiy" has come to an end. Specialists on radiation and chemical biology from both countries carried out research on Black Sea pollution levels during the spring flash flood period, as this is the time that the greatest quantity of harmful substances flow into the sea.

Scientists from the Institute of Southern Seas Biology of the Ukrainian Academy of Sciences and scientists from the U.S. Oceanographic Institute at Woods Hole worked aboard the Soviet vessel. This is the first joint expedition of the two leading institutions in this sphere since the accident at the Chernobyl nuclear power station 3 years ago. Soviet scientists are carrying out similar monitoring of the radiation situation. However, despite their statement that it is safe to take one's vacation at a Black Sea resort, now and again there are rumors that the situation is unfavorable there as far as the seawater is concerned.

"Is there really a threat to people's health on the renowned beaches due to radioactive pollution of the water?" I asked Doctor Hugh Livingston, a member of the expedition.

"No problems! The water, fish, and shellfish of the Black Sea are safe for people," the U.S. scientist said.

"It should be borne in mind that we studied radiation safety," stressed Professor Gennadiy Polikarpov, leader of the expedition. "Unfortunately, however, things are not so good as far as other sources of pollution are concerned. The ecological situation here gives cause for alarm, and calls for united efforts, above all on the part of the countries that border the Black Sea, to preserve its life."

Radiation Protection Pact Signed With GDR

LD2104093889 Moscow TASS International Service
in Russian 1805 GMT 20 Apr 89

[Text] Berlin, 20 Apr (TASS)—An agreement on cooperation in radiation protection was signed here today between the GDR State Office for Atomic Safety and Radiation Protection and the USSR Ministry of Health.

Signed by the chairman of the committee, G. Sitzlack, and USSR First Deputy Health Minister I. Denisov, the agreement is described by ADN as a logical embodiment of fruitful joint research conducted over a period of many years.

The agreement provides for close cooperation between state bodies in checking radiational levels in residential areas and natural background radiation, and in the carrying out of preventive measures against disasters and accidents associated with radiation, as well as theoretical work on the problems in question. An important role will be played by the materials and experience obtained during the elimination of the consequences of the tragedy at Chernobyl atomic electric power station.

News Conference Held on Chernobyl Situation

LD2204171689 Moscow TASS in English
1640 GMT 22 Apr 89

[Text] Kiev, April 22 (TASS)—A news conference at week's end in Kiev focused on the aftermath of the Chernobyl nuclear accident and the economic and social development of the affected areas.

The conference was organized by the Ukrainian Council of Ministers' Relief Commission for dealing with results of natural calamities and accidents, set up in April 1986 in the wake of the Chernobyl nuclear disaster.

Much has been done to clean up the mess, according to Yevgeniy Kachalovskiy, deputy chairman of the Ukrainian Council of Ministers and chairman of the commission.

Two of the eight billion roubles allocated for the effort were spent on houses and other social and cultural facilities, wage bonuses, and benefits to the people.

A total of 7,500 family homes and apartment houses for 500 flats were built in the first eight months after the accident alone.

Some 8,500 flats in Kiev and Chernigov were allocated to evacuees from contaminated areas.

Eight Soviet republics helped build the city of Slavutich, which is now home to ten thousand workers.

"Radiological situation at the Chernobyl nuclear power station causes no concern," the plant's director said.

"Radiation does not exceed pre-accident levels. Numerous sensors are used to constantly monitor the state of the damaged fourth unit and the sarcophagus over it," Mikhail Umanets said.

He ruled out the possibility of a chain reaction, saying that the available data from the buried reactor and nuclear fuel shows that this is impossible.

The construction of the fifth and sixth unit has been halted, he said.

"Radiation in the largest water reservoirs in the Ukraine is 10-70 times below safety levels," said Academician Boris Paton, president of the Ukrainian Academy of Sciences.

"Drinking water is safe," he assured.

A total of 260,000 people underwent medical check-ups since the accident in 1986, according to Ukrainian Health Minister Yuriy Spizhenko.

No growth in cancer cases has been reported, nor any other health abnormalities were detected, he said.

The number of medical cases in polluted rural areas is no higher than on average in the Ukraine, the minister said.

Some 70,000 children are spending vacations in Ukrainian sanatoriums every year. As many as 200,000 children went there in the first year after the accident.

Agricultural products are checked for radiation at Ukrainian markets, he said.

It was announced that the residential ban has been lifted in some villages in the restricted 30-km zone, after a careful study of the radiological situation. These areas were not affected by the nuclear fall-out, it was said, and people could be allowed to live there.

Construction of Chernobyl Power Sets Cancelled
*LD2004123789 Moscow TASS International Service
in Russian 0945 GMT 20 Apr 89*

[Text] Moscow, 20 Apr (TASS)—The USSR Council of Ministers has adopted the unambiguous decision to give up construction of the fifth and sixth power sets of the Chernobyl nuclear electric power station [AES], construction which was mothballed following the accident. It is also not planned to expand other operational nuclear stations using RBMK-type reactors. In particular, it has been decided to curtail the construction of the fourth power set at the Smolensk AES and the sixth set at the Kursk AES.

This was reported by Vladimir Maryin, first deputy chairman of the USSR Council of Ministers Bureau of the Fuel and Energy Complex, in an interview for the Soviet PRAVITELSTVENNIY VESTNIK.

He reported that the Council of Ministers has adopted a decision on additional measures on improving safety at the country's nuclear power stations. This document envisages that all the 14 existing power sets built in the seventies will undergo reconstruction in 1989-94. These, as well as the newly constructed power sets, will be equipped with additional safety systems which will ensure the reliable cooling of the reactor in the event of

an accident situation, and the localization of possible releases of radioactive substances in the event of a rupture in the reactor installation for any reason.

In connection with the end of the rated life for reactor equipment operation a decision has been made to shut down the second power set at the Beloyarsk AES this year and the second power set at the Novovoronezh AES in 1990. The first power sets at these stations were shut down a few years ago.

Vladimir Maryin said that the work for developing reactor installations with improved safety characteristics is in full swing. "The main purpose is to create installations with such a degree of intrinsic safety which does not depend on faults in the performance of the equipment or staff errors." Planning work and the necessary research and design studies are to be completed by the mid-nineties and then the construction of a new generation of nuclear power stations is to be started.

To extend glasnost in AES operation, information centers are being set up at each of them. Data on the work of power units, the introduced and planned measures for providing their safety, and the radiation situation on the adjoining territory can be obtained here. Nuclear power stations are now open for visitation by representatives of labor collectives, educational establishments, or public organizations. A public information center for nuclear power engineering has been set up in Moscow. A discussion club of the Kurchatov Institute for Nuclear Power holds regular meetings. Anyone may participate in its work.

Chernobyl Plant Director Updates Situation
*PM2104094189 Moscow NEDELYA in Russian
No 15, 10-16 Apr 89 p 5*

[Interview with Chernobyl Nuclear Power Station director M.P. Umanets by IZVESTIYA own correspondent Nikolay Baklanov: "Chernobyl Nuclear Power Station, 3 Years On"; date and place not given]

[Text] Kiev—On 26 April it will be 3 years since the accident at the Chernobyl Nuclear Power Station. What is the situation at and around the station at the moment? M.P. Umanets, director of the Chernobyl Nuclear Power Station, answers an IZVESTIYA correspondent's questions.

[Umanets] All three operational power units are operating normally. In 1988 we overfulfilled the state plan, generating more than 20 billion kilowatt-hours of electricity. Since the accident a total of 41,661,000,000 kilowatt hours of electricity has been produced. As for the fourth, damaged unit, substantial investigations are being made to study the state of the remaining fuel and the possibility of removing it. A range of construction engineering measures has been carried out to strengthen

protection of the "Bunker." Through careful decontamination it has been possible to substantially reduce the radiation background at and around the station. We are aiming to bring it down to the old, pre-accident or, as we call it, "prewar" level.

[Baklanov] But rumors about the station persist; there is anxious talk of units being shut down, of the nuclear fuel inside the "tomb" behaving unpredictably....

[Umanets] As a result of numerous exploratory drillings at the "Bunker" we have a complete picture of how and where the remaining fuel is distributed. Its condition is being monitored in all parameters at approximately 200 points. Rises in temperature, discharges, and explosions inside the "tomb" cannot occur. Even if (purely hypothetically) the facility collapsed for some reason there would be no explosion.

Power units are indeed shut down relatively often, despite the reconstruction that has been carried out. This is due to the fundamental change of approach to station operation. Formerly, staff who shut down a unit were almost regarded as having committed an offense. Now we are urging, even demanding them to follow the rule: If you have the slightest doubt, shut it down immediately! And we all quietly examine what the problem is, what happened or what might have happened.

It is important to point out that considerable work has been carried out at the station to eliminate the design faults in the RBMK-1000, which were one cause of the accident on 26 April 1986.

[Baklanov] What is your view of the prospects for the development of nuclear energy, in particular, of the commissioning of the fifth and sixth power units at the Chernobyl station?

[Umanets] The government has decided that the fifth and sixth units will not be commissioned. I will admit that initially I held a different view—I was in favor of it. But I changed my view—largely under the influence of public opinion, which has to be considered. At the same time, I am convinced that there is no alternative to nuclear energy. Hydroelectric power stations on lowland rivers cause a lot of damage to nature—inundating fertile land and creating "manmade" seas of putrefaction. And all this has a bad effect on the climate. Coal, oil, and gas are sources of energy which are finite anyway. Fuel stocks for nuclear power stations are many times greater. From the environmental protection viewpoint nuclear power stations are among the cleanest production facilities. In my view, what one must be seeking is not the abandonment of nuclear energy, but safer and more ecologically friendly nuclear power stations monitored by commissions of independent international and public experts.

Nuclear Society Established, Charter Adopted

*LD1804031189 Moscow Television Service in Russian
1700 GMT 17 Apr 89*

[From the "Vremya" newscast]

[Text] [Announcer] The USSR Nuclear Society Constituent Conference took place in Moscow today. [video shows Academician Yeugeniy Pavlovich Velikhov, USSR Nuclear society president, addressing hall]

[Correspondent A. Fedorovich, identified by caption, off-screen] So, another organization, the USSR Nuclear society, has been added to the country's public organizations. Today the conference adopted the society's charter and drafted the program for its activity. The society has many tasks, the main task being to develop the creative activity of all those who work or study in the nuclear science industry. [video shows Fedorovich, Velikhov in a room]

[Fedorovich] So, yet another society has emerged. Yevgeniy Pavlovich, could you please say what main problems, in your view, should the new society solve?

[Velikhov] First of all, in the community—those who dealt with nuclear physics and nuclear power—have had, for many years, the safeguarding of the USSR's security as their main task. That task has been solved, that is nuclear arms have been developed, and now you know that, because of the new international developments, things are progressing toward eliminating these arms. But this is yet a very long road, which should be traveled step by step. The latest step is the halting from our side—Mikhail Sergeyevich's unilateral proposals are very important—of the production of enriched uranium and the closing of two reactors. This, I think, is a very important initiative on the same road, a road toward a nuclear-free world. All our community will play a great role on this road. The issue of nuclear power engineering is acquiring an ever increasing importance. Of course, it is not for the Nuclear Society to decide whether or not nuclear power engineering is needed. But, together with the whole society and the national economy, it should decide what shape nuclear power engineering should take, if it is needed. It looks as if it is needed. The society should unite all those forces, already on a new basis, and should construct the future of nuclear power engineering in the proper way.

Nuclear Power Information Center Opens to Public

*LD1504033489 Moscow Domestic Service in Russian
1950 GMT 14 Apr 89*

[Text] A center for public information has opened at the interdepartmental council for information and links with the public in the nuclear sphere. Its first information bulletin coincided with Friday's opening at the USSR VDNKh [Exhibition of Achievements of the National Economy of the USSR] of a nuclear power

pavilion. Nuclear power is acknowledged as an objective necessity throughout the world. Twenty-six countries are currently developing this sector.

Moscow Nuclear Station Cooperation Center Set Up
*LD2004203489 Moscow TASS in English 1642 GMT
20 Apr 89*

[Text] Moscow April 20 TASS—A regional centre of the World Association of Organisations Operating Nuclear Power Stations has been set up in Moscow, Boris Prushinskiy told a TASS correspondent. Prushinskiy has been appointed the centre's director.

Enterprises and organisations operating nuclear power stations (NPS) in eight countries—Bulgaria, Hungary, the German Democratic Republic, Cuba, Poland, the Soviet Union, Czechoslovakia, and Finland—became members of the centre. The regional centre's headquarters has been organized in Moscow on the basis of the All-Union Nuke Station Operation Research Institute.

"The principal purpose of the centre is to raise to the maximum the safety and reliability of nuclear power stations, both operating ones and those under construction, through expansion of direct cooperation and exchanges of experience between organisations operating nuclear stations", Prushinskiy emphasized.

"There is no acceptable alternative to nuclear power engineering. A high level of safety and reliability of the operation of NPS equipment should become an indispensable condition for the development of nuclear power engineering".

"The structure of the World Association includes four regional centres—in Atlanta, Paris, Moscow, and Tokyo as well as the coordinating centre in London. The establishment of all regional centres has been completed with the setting up of the regional centre in Moscow", Prushinskiy said.

An official opening and the first conference of the World Association members are to be held in Moscow in May this year.

Nuclear Society Receives Messages of Support
*LD1904193789 Moscow TASS in English 1647 GMT
19 Apr 89*

[Text] Moscow April 19 TASS—The Soviet nuclear society, inaugurated last Monday [17 April] on the initiatives of a group of prominent Soviet scientists, has received a message of congratulations from the European nuclear society. It contains also a proposal to accede to that body, rallying several countries of Europe. We are prepared to grant you membership right away, at today's regular meeting, the message says. Greetings have also been received from the American nuclear society.

The constituent conference of the Soviet nuclear society has endorsed its rules, mapped out a programme for the new public organization's future activities, Yevgeniy Velikhov, vice-president of the USSR Academy of Sciences, has been elected president of the society. His deputies are academician Nikolay Ponomarev-Stepnov, first deputy director of the Moscow atomic energy institute named after Kurchatov, and Viktor Orlov, deputy director of the "Energotekhnika" scientific research and designing institute.

Academician Ponomarev-Stepnov said in a TASS interview that one of the society's main tasks was to ensure the safety of atomic power plants in the Soviet Union, to promote international cooperation in this sphere, to carry on explanatory work among the population.

The society is called upon to play an important role in the struggle for a nuclear-free world. In this connection the academician recalled that during Mikhail Gorbachev's visit to Great Britain, the latter had announced the Soviet Union's decision to discontinue this year the production of highly-enriched uranium for military uses and that it plans to shut down in the course of the next two years two industrial reactors producing plutonium for military purposes. This, the scientist noted, is an important initiative on the road to a nuclear-free world.

Interior Ministry Expert Criticizes Nuclear Power
*AU1404155089 Hamburg DIE ZEIT in German
14 Apr 89 p 51*

[Article by Boris A. Kurkin, jurist and lecturer at the Academy of the USSR Interior Ministry: "The Globe Is Being Mined; A Soviet Plea Against Nuclear Power"]

[Text] Moscow—To give us an idea of what we are doing when we "fully support" the development of our country's nuclear energy program, I would like to broach a vital question—that of nuclear waste. There is no other energy source which, after having been used, leaves waste behind that is quite so dangerous as the fission products of nuclear energy (plutonium, cesium, strontium, etc.). They cannot be destroyed, but only kept "for all time" in special stores.

We have been extremely fast in building nuclear power plants without considering the final product of the nuclear burning cycle. The chemical treatment of used nuclear fuel lags far behind the industrial and technological development of the other stages of the burning cycle. Dumps of radioactive waste are growing disastrously because secure final storage has not yet been developed.

There is a persistent silence on this vital question in the context of nuclear energy, namely the "interment" of highly reactive waste "for all time." Not a single expert is able to say how highly reactive waste can be stored in a way that is able to prevent radiation, which will last several millenia, from posing any danger to our lives. It

is also unclear how the huge amounts of material with weak and medium-level radiation that occur in the production and use of nuclear fuels can be managed.

The final storage of radioactive slag is the most difficult task of nuclear technology. Containers in which the radiating remains can be "buried" may be destroyed in the course of time (however, this may be seen in terms of geological dimensions.) Moreover, radioactivity can escape everywhere.

In the context of the Chernobyl catastrophe, Soviet medical experts, particularly L. Il'in, vice president of the Academy of Medical Sciences, are inclined to affirm that, after all, nothing terrible has happened. "It is already clear that the real radiation doses were smaller than expected by the factor 10."

One of the dangerous features of nuclear power plants lies in the fact that their lifespan is relatively short and

that they cause many problems once they have "died." Dismantling a nuclear power plant is a difficult scientific problem; no reliable concept has been worked out for this purpose so far. All approaches to the solution of this problem show severe shortcomings. Some calculate that the complete dismantling of a nuclear power plant will take 50 years, others speak of 100 years. Recently, scientists detected radioactive components, including Nickel-59 and Niobium-94, in the construction scaffolding of an old reactor. The half life of these substances is 75,000 and 20,000 years respectively.

The conclusion is that the development of nuclear energy is tantamount to mining our own globe with nuclear bullets with incorporated timers, which will cost us dear. The timers will go off—even if the exact time is still uncertain. Do we really have to continue on a path that is verging on suicide for the benefit of those authorities that are interested in nuclear energy?

EUROPEAN AFFAIRS

FRG, Austria Build Rocket Laboratory in Iraq
52002421z Vienna PROFIL in German
20 Mar 89 pp 36-38

[Article by Alan George (London) and Herbert Lamsinger: "Rocket Merry-Go-Round"]

[Text] Austrian and German firms are building a research center in Iraq. The list of suppliers and testimony by witnesses indicate that the facility under construction is a highly specialized rocket laboratory.

Under the burning desert sun perspiring men were running as hard as they could. The runners were circling a closed-off area near the Iraqi university town of Mosul about 350 km north of Baghdad. The date was 1 May 1987.

The runners, most of them workers from Germany and Austria, had been brought to Mosul to build a research and technology center there. As part of the 1 May festivities, the German-Austrian project management had organized a cross-country race around the construction site. The winning time was 26 minutes.

The construction site itself, guarded by Iraqi militiamen posted on watchtowers and using TV cameras, is not run like a sports center but like a military camp.

One eyewitness¹ reports that Mercedes 4-wheel drive vehicles with radar equipment mounted on their roofs are constantly on patrol among the different buildings. A completely soundproof "listening room" has been built by Siemens to pick up radio signals. There is a 120-meter-long underground firing tunnel about 4 meters in diameter. It has reinforced lead walls and is panelled with egg carton-like, soundproof material.

Our witness also tells of wind tunnels about 12 meters long and 2 meters in diameter inside which speeds of mach 3 can be simulated. Video cameras are used to record the behavior of the tested objects. The technical personnel directs the tests from computer control rooms located behind bulletproof glass.

In the southwest corner of the site there is a row of 10-meter-high, squat concrete towers or "resistance structures." Three of the walls and the slanted roof have been reinforced in order to withstand extremely strong, sudden shock waves. Only one of the walls is made of wood. Whenever an explosion is set off inside the tower, it blasts away this part of the structure which can always be rebuilt.

Some of the buildings contain huge drilling and milling machines equipped with laser technology which enables them to perform precision work down to one-tenth of a millimeter. At the same time, this equipment can be used to produce hollow objects several meters long.

Another former worker on the Mosul project says there was talk on repeated occasions of problems in obtaining a gyro-controlled guidance system "for something."

A German-Austrian consortium of firms was given the job of managing the overall project which goes by the name of SAAD 16 by the Iraqi Government 4 years ago.

The general contractor responsible for the construction of the buildings and the necessary infrastructure is Consultco, a Vienna planning firm, 50 percent of which is owned by Girozentrale (GZ) and the remaining 50 by four Vienna civil engineering firms.

Consultco divided the construction work among dozens of Austrian subcontractors, e.g., the Graz construction firm of Ast, the plumbing and airconditioning firm of Swatek & Cerny or the CA [Credit Anstalt] owned firm of Hutter & Schranz.²

Walter Bleyer, Consultco's managing director, says that the firm has "nothing to do with the technical equipment."

Responsibility for the technical side of the project rests with Gildemeister Projecta, a planning firm in Bielefeld, West Germany. The main supplier of technology, however, is Messerschmitt-Boelkow-Blohm (MBB), the German arms concern—and Gildemeister is under contract to MBB.

The total value of the Austrian contract which originally amounted to 1.6 billion schillings has increased substantially in the meantime due to delays and project modifications.

The overall cost of SAAD 16 is likely to be a great deal more than 10 billion schillings.

Officially, the installation is termed a purely civilian research center associated with Mosul University. On 20 August 1985, Gildemeister applied to the FRG Federal Agency for Trade and Industry for a "negative certificate" stating that the firm did not require a special export license for its part of the project. Under the heading "detailed list of materials" the firm listed "machines and electrical equipment; control, metering and testing equipment for a research, development, and training institute comprising of eight main departments. Codename: SAAD 16."

But Mossad, the Israeli intelligence service, which has long suspected that SAAD 16 is really a primarily military research center planted news items to that effect, e.g., in the 6 February 1989 issue of MIDEAST MARKET, the FINANCIAL TIMES information service. According to that particular item, SAAD 16 represents the continuation of the so-called Condor 2 project originally restricted to Egypt and Argentina. The project goal is to develop an intermediate-range missile with a

range of 1,000 km easily capable of delivering nuclear warheads to Tehran or Tel Aviv. The MIDEAST MARKET report last February stated that MBB was said to be involved in the project.

The documents and statements obtained by PROFIL not only confirm the fact that MBB, an armament concern specializing in air combat equipment, is supplying the main technology for the SAAD 16 project. They also confirm the suspicion (based among other things on the identity of the other suppliers) that Germans and Austrians have built a turnkey military development center for Saddam Hussein, the Iraqi dictator—which the participating firms vehemently deny.

What is more, [the PROFIL material also makes it clear that] a network of Swiss and Austrian small businesses and letterhead companies was used to sell hundreds of millions of schillings worth of military technology to various customers, including Iraq. Some of those involved in these deals included former MBB engineers and business executives who had already been responsible for procuring the necessary technology for the Argentinian-Egyptian Condor 2 missile project.

Europeans who work in Baghdad report that a plant is being built somewhere in northern Iraq which will some day produce the items presently being developed and tested in Mosul. The codename of this project is said to be DOT.

The know-how required for series production of the Iraqi intermediate-range missile would not be provided by the firms directly involved in the SAAD 16 project but by the Condor team via various dummy corporations.

The availability of bills of lading, telex traffic, and other documents makes it comparatively easy to gain an insight into the SAAD 16 project.

Gildemeister's internal monthly report, for example, lists Fritz Werner Ltd., a German industrial equipment firm, as one of the suppliers. DER SPIEGEL has reported that Werner Ltd., a state-owned arms manufacturer, has been supplying Iran with a wide variety of military items for years, including grenades, antiaircraft shells, panzerfausts. In its 31/87 issue, DER SPIEGEL reported that Werner Ltd. "even helped the Iranians set up a missile industry of their own" but only after having applied for and received "negative certificates" attesting to the use of the export goods for non-military purposes.

Werner Ltd. states that its shipment on behalf of Gildemeister via a non-affiliated distribution company consisted of one "universal drilling machine."

The roster of suppliers for the SAAD 16 project also includes Mauser, the well-known small arms manufacturer and the Hesse firm of Karl Kolb which is already under investigation for delivering poison gas components to Iraq.

Under contract to Gildemeister the Graz-based AVL Co. (according to its spokesman Iroli Killmann) manufactured "speed indicators, pressure meters and dynamometers as well as a weather station."

Aviatec, a German subsidiary of Rheinmetall, a concern by no means averse to dealing in arms, built two wind tunnels; VOEST supplied machine tools and Hewlett-Packard, the computer manufacturer, also made money on the Mosul project.

MBB, which is involved in the SAAD 16 project to the tune of 500 million schillings by its own admission, shipped an entire weather station to Mosul, complete with balloons, parachutes, air, wind and temperature measuring instruments and a radio station including the necessary software. (When Werner Ltd. provided the equipment for the Iranian "Semnan" rocket farm, DER SPIEGEL reports, the firm included spare parts for a radio station and for meteorological equipment in its offer.)

The (understandably incomplete) PROFIL documents do not provide any information concerning additional materials MBB may have supplied to the SAAD 16 project.

A handful of telexes merely state that MBB exports conducted comprehensive training courses in Munich in connection with the project.

Another training program, also arranged via telex, establishes a first connection between the Iraqi SAAD 16 project and the development of the Argentinian-Egyptian Condor 2 intermediate-range missile which heretofore had merely been the subject of unconfirmed reports by businessmen and intelligence agencies.

One item in the Gildemeister telex file lists Bowas Induplan Chemie, a Salzburg-based company with a staff of 55, as being responsible for Course 36.1-36.5, a seminar on explosives. The majority shareholder of Bowas Induplan which deals in chemical equipment is the Bohlen und Halbach family.

Helmut Raiser, a 62-year-old native Bavarian, was managing director and co-owner of Bowas until 1984. Raiser, for that matter, is at the center of a dense tangle of companies which keep switching names and which worked on the Condor project quite openly—at least initially.

In 1979, the then Argentinian military junta ordered the development of a weather reconnaissance rocket, designated as Condor 1. With the permission of the FRG Government MBB joined the project group which was officially registered as the Consen Co. in Zug, Switzerland.

A Salzburg firm that went by the name of Induplan Chemie at the time took part in the construction of the weather rocket. That same firm is now called Bowas Induplan. Peter Schwarz, the present managing director, says that the firm "supplied plans for parts of the propellant system" for the Condor 1 project.

At the Paris Air Show in 1985, the Argentinians presented the Condor 1A as a multipurpose rocket.

In the meantime, the Condor 2 project had long since been launched in cooperation with the Egyptian Government. Officially, the project goal still was to build a weather rocket and officially, MBB was still involved—as one of the Consen partners. The man at the helm of the Consen group was none other than Helmut Raiser, the former director of Bowas Induplan.

Less than 2 years ago when it had long since become clear that Condor 2 was to be turned into an intermediate-range missile usable for military purposes, FRG Government pressure forced MBB to withdraw from the project. Last August, STERN quoted Roland Mecklinger, MBB's board chairman, as saying that his firm withdrew from the project because it did not wish "to cooperate with people capable of setting the world on fire."

MBB itself quit the project; but MBB technical personnel, given lucrative contracts by Raiser, stayed on. Development of the deadly Condor 2 proceeded apace.

When Consen director Raiser left Bowas Induplan Chemie in Salzburg in 1984, the firm had already lost another staff member, its executive secretary Werner Schoeffel. Ludwig Aumayr, a technical expert, also quit his job with Bowas.

The three men stayed together. Aumayr is slated to take over as managing director of Delta Consult Studiengesellschaft [Study Group] Ltd., a firm established in Salzburg in 1984. Werner Schoeffel holds the job of executive secretary of that firm.

The trade register lists Ifat Corporation Ltd. of Zug, Switzerland as the majority shareholder of Delta Consult—and the man behind Ifat is Helmut Raiser.

On 22 September 1988, a new firm named Tencom Ltd. was entered in the trade register at picturesque Bad Aussee in Austria. Tencom's managing director and senior partner is Ludwig Aumayr; Werner Schoeffel is listed as executive secretary and Ms. Francine Painthiaux-Schmidt as assistant managing director. Hermann Schmidt, the lady's husband, was one of MBB's top technicians.

Similar configurations can be found in a firm which goes by the name of Gamma and in which Schoeffel also holds the executive secretary's post or in PBG-Projektbetreuung [Project Management] Ltd. located in Schoeffel's Bavarian domicile of Freising. PBG, for its part, is a junior partner of Delta Consult.

In terms of personnel all of these firms are connected to other companies (some since dissolved) in a variety of tax havens, e.g., Contech, Zug; Desiniek, Zug; Matrix, Monaco; Consen Investment, Monaco.

Aumayr is also listed as executive secretary of Delta System, a firm registered in Salzburg. The managing directors of Delta System are Messrs. Adolf Hammer and Ekkehard Schrotz. Both men are former MBB engineers; both worked on the Condor project and Schrotz at least is one of the top executives of the Consen group of companies.

On 27 May 1988, Schrotz's car blew up in Monte Carlo. According to French police records, responsibility for the attack was claimed by "Guardians of Islam," an apparently Iranian group which accused Schrotz of having sold missiles to Iraq.

Following this attack which was reported by STERN last August, Schrotz went underground "at a secret location" according to the West German magazine. Schrotz has resurfaced as managing director of Delta System in Salzburg.

He is back together with the other gentlemen that make up the old Consen and Bowas group. "They will not let go of the project," one Consen insider says. "There is too much money in it."

According to Bowas director Schwarz, however, Bowas Induplan Chemie in its present configuration has nothing to do with the activities of its former staffers Raiser, Schoeffel, and Aumayr. The explosives seminar in Iraq was set up on the basis of a request by Gildemeister. "Since Bowas Induplan did not have an expert of its own on its payroll," says Schwarz, "the job was turned over to a free-lance expert."

Schoeffel and Raiser did not act as go-betweens, Schwarz says. Raiser himself has "no comment." And as for Schoeffel, he cannot see what his connection to missile deals might be. "Someone is staging a witch hunt," he says.

Footnotes

1. Name and address of the publication is known. [as published]

2. PROFIL 10/89 had erroneously related this undertaking to the Assmann-Group. In reality only the Hutter & Schrantz Bautechnik which does not have an interest in

the SAAD Project was acquired from Emerich Assmann. The Hutter & Schrantz AG and Hutter & Schrantz Siebtechnik belong to CA-Konzern.

AUSTRIA

PROFIL Views Involvement in Iraq Arms Plant
*AU2404180989 Vienna PROFIL in German 24
Apr 89 pp 38-42*

[Report by Herbert Langsner and Alan George: "Death Through DOT"]

[Text] For harmless construction plans, the documents seemed to have been prepared in a very secret way. All company names were covered when the plans were copied, a stamp pointed to the classified nature of the papers. There was not even a precise mention of the location for which the plans were made.

Yet the deal certainly sounded enticing. The Vienna planning company Consultco, a subsidiary of Girozentrale Bank, was to build a 2-billion schilling industrial complex in Iraq. The name of the project: DOT. It was commissioned by the Iraqi State Organization for Technical Industries (SOTI), a subdivision of the Defense Ministry.

Consultco received the offer to participate in the DOT project early in 1986 from the Styrian businessman and construction expert Rupert Trummer. Trummer introduced himself as a representative of the Ifat (Institute for Advanced Technology) company, based in the Swiss city of Zug and in Monaco. According to what Trummer told the people from Consultco, Ifat was appointed as general agent by the Iraqi Government to carry out the large-scale DOT order.

No one knew what to make of the name of Ifat at that time. It was only last summer that this company made headlines in several U.S. newspapers. In El Dorado Hills, Northern California, the Egyptian-born Abdelkader Helmy was arrested under suspicion of espionage. As an employee of the U.S. Aerojet General arms company, Helmy spied and passed on research results about missile propulsion technology. As he later stated to U.S. authorities, he was working under orders from the Swiss Ifat company, based in Zug. The small-scale espionage scandal was not further followed up. At that time, the summer of 1988, Ifat had already been working on its DOT project for 2 years.

It is constructing a high-tech complex for the production of intermediate-range missiles. The order was to be given to Consultco because it was already involved in another Iraqi project, the Saad 16, for which it provided long-term financing. In return, the Iraqis promised that Consultco would be given the next order and immediately receive payment—that was the military project DOT.

Saad 16 has already been in the spotlight of the FRG media during the past few weeks. Officially described as a civilian research center for the Iraqi University of Mosul, it was in reality a giant military test laboratory, for which the technological equipment has been mainly supplied by the FRG company Messerschmidt-Boelkow-Blohm (MBB). The state prosecutor of Bielefeld has been investigating the FRG companies involved since March on charges of illegal exports for Saad 16.

However, the Saad project is really only the research plant for the actual production of the "Islamic Missile" which can carry nuclear warheads and poison gas bombs over a distance of up to 1,000 km with high accuracy.

So far, Iraq has had to rely mainly on Soviet supplies of missiles, and even from there it received only short-range missiles.

In the complex, which is currently being constructed under the project name DOT, Iraqi President Saddam Husayn will be able to develop and construct his own missile system, independent of other states.

Behind DOT's general agent is a group of mainly FRG technicians and businessmen working with the company seats in Salzburg and Monaco who have established trade in military technology, particularly missiles.

Since the Saad 16 affair became public in March, it was initially PROFIL, and then STERN, the BBC series "Panorama," and SPIEGEL TV which reported the rumors that Ifat people were also involved in some project in Iraq.

What has not been clear so far is who is actually building a plant for the production of missiles in Iraq, where, and whether it has been built at all. The DOT project has so far remained undetected.

The rumors can now be confirmed and specified.

DOT was described to Consultco as a plant consisting of three different parts: The Austrians were to set up office buildings and machine halls, and to take care of the electric, water, and air conditioning installations for plants near Kerbala, some 50 km south of Baghdad; Hillah, some 90 km south of Baghdad; and Fallujah, 50 km east of Baghdad.

However, there has never been discussion about what kind of machinery was to be operated in these halls, and who was going to produce what.

Under the leadership of Consultco, a group of companies was established to submit an offer for DOT: The Stuttgart-based Zueblin company was to take care of construction work; the Vienna Bacon company, the air conditioning equipment; and the Austrian section of Brown-Boveri was to carry out all electrical installations.

"It is correct that 3 years ago we worked out a project called DOT in Iraq," said the former head of the Summerring-Graz-Pauker company and present head of Brown-Boveri, Klaus Woltron, adding that "in the end, the project came to nothing."

Ultimately, the entire Consultco group did not receive the order: "The negotiations with Mr Trummer and Ifat were stopped," Consultco manager Walter Bleier said, "we did not even get to the stage of submitting an official tender." At 4 billion schillings, the Consultco tender was simply too expensive.

The planning of the construction was finally carried out by another Austrian company: the Graz engineering office Feneberg, with a staff of 70, one of the largest of its kind in Austria.

The technological planning for the military installation was also carried out by Austrian companies: The Salzburg company Delta Consult drew up the so-called detailed estimate, which contains details of the required electricity and cooling capacities of the individual buildings, and all other details of technical installations.

Starting from Salzburg, the network of the missile dealers working for Iraq can be traced quite easily.

In the Salzburg commercial register the Ifat Corporation from Zug figures as the company that holds the majority interest in Delta Consult.

Minority interests are held by the PBG company in Freising, Bavaria, and the Salzburg engineer Ludwig Aumayr. The FRG citizen Werner Schoeffel, head of PBG, holds a special statutory authority.

At number 2 Emil-Kofler-Gasse in Salzburg, the same building in which Delta Consult is based, there is the headquarters of Delta System Studiengesellschaft [Delta Systems Study Corporation]. The purpose of the corporation is to carry out feasibility studies and develop new technologies.

The Zug-based Integradora Aerospecial S.A. holds a majority interest in Delta Systems—Ludwig Aumayr a minority interest.

The FRG citizens Ekkehard Schrotz and Adolf Karl Hammer are the managers of Delta Systems.

Until the end of 1987, Hammer was the head of the FRG's MBB arms and space concern's "military engineering" department. On 24 August 1988, the name of missile specialist Hammer was entered in the commercial register of Zug as director of the Ifat Corporation.

Ekkehard Schrotz, the second head of Delta Systems, is also a former employee of MBB. Until November 1988, he served on Ifat's board of directors.

Integradora Aerospecial, which holds the majority interest in Delta Systems, is also closely connected to Ifat and the people behind it.

Closely connected to Ifat are half a dozen other Swiss and Austrian companies—Consen, Desintec, Condor Holding, Condor Projecta, Conchem (all from Switzerland), Tecom (from Salzburg and Bad Aussee), or PBG (Freising)—that are all run and controlled by the same group of people. The different company names are used according to requirements.

FRG citizen Wilhelm Vullrde, for example, was appointed director of Ifat's affiliated company Consen as of 17 January 1989. Until the end of 1985, Vullrde worked as project head at the notorious Saad 16 building site, where—according to the Bielefeld state prosecutor—a "missile testing plant" has been built. As the director of Consen, the highly-qualified engineer can be called under the Salzburg telephone number of the Delta Consult and Delta Systems companies.

Helmut Raiser, an expert in explosive agents and fuels and a resident of Zug, has been the central figure in the confusingly organized missile ring for a long time. Until 1984, Raiser was manager and held an interest in the Salzburg Bowas Induplan Chemie, a company specializing in chemical plants, which belongs to the FRG Bohlen-Halbach group. Subsequently Raiser fully concentrated on the profitable arms business. The name of the Bavarian-born Raiser crops up in all lists of boards of directors of companies surrounding Ifat and the like. He does not want to comment on the missile deals: "Last year I withdrew from all that business."

Certainly not as a poor man: The Zug trade register shows that the Ifat subsidiary Desintec alone paid 1.8 million Swiss francs cash as dividends in the 1986 business year. The recipient of the money: Helmut Raiser.

This makes a change of companies profitable. Ludwig Aumayr and Werner Schoeffel (Delta Consult, Delta System, Tecom) were also employed by Bowas Salzburg until the beginning of the 1980's, before they founded an independent business together with Raiser.

The other missiles mercenaries were recruited from MBB employees who had left the company.

Like Delta-System chiefs Schrotz and Hammer, Hermann Karl Schmidt, who lives in Monaco, is also a former MBB employee. Schmidt, who also has several seats on the board of directors in the business empire, controlled the negotiations for the DOT project from Monte Carlo.

In their old company MBB the defectors are no longer welcome—at least officially: "The Ifat people are banned from entering the building," said MBB spokesman Udo Philipp, affirming the anger at the missile dealers. "They tricked us over these sensitive matters."

These matters started in 1979 when the Argentine Government invited MBB to participate in the development of a meteorological research rocket. The name of the project: Condor 1.

Then the Argentinians wanted to develop a missile with a range of 1,000 km and greater precision under the name Condor 2.

As technical advisers, they commissioned the Swiss company Consen (alias Ifat), which was headed by Helmut Raiser (chairman of the board of directors) and Herrmann Karl Schmidt at that time (1984).

MBB also participated again, with its subsidiary Transtechnica.

In 1985, after intervention by the FRG Government, MBB—its main owners are Bavaria, Hamburg, and Bremen—had to leave the Condor 2 project, which had meanwhile become too obviously a military project.

Nevertheless, Transtechnica continued to make deliveries to Consen and its Argentine clients until mid-1986. Says MBB man Philipp: "Things happened there which were not known to the MBB management."

Or which it did not want to know. After all, it is striking how intensively the Munich state company cooperated with its ex-employees—as if the Ifat/Consen group were a business unit for sensitive projects, which had deliberately been separated from MBB.

In any case, after the Argentine project, the men around Helmut Raiser and Herrmann Karl Schmidt arranged a new deal for themselves and MBB—an order from the Egyptian Government for the development of a missile with a range of 120 km.

Until the end of last year, MBB delivered "laboratory equipment" to the Egyptians. The general contractors for the project in Egypt were Raiser and company—as later for DOT in Iraq—under the company name Ifat.

The Graz Feneberg Engineering Bureau also participated in drawing up construction plans in Egypt. And the technical checks were carried out—as in the case of DOT—by Delta Consult, the Salzburg Ifat subsidiary.

Last year, the Egyptian project also came to an end for MBB "because of U.S. intervention" (Philipp). The missile with a 120-km range had, after all, turned into a missile with a longer range—like Condor 2 in Argentina.

After the interrupted Egyptian deal, the Salzburg technology dealers still had Iraq. They did not even have to invest much inventive spirit in DOT: "The building plans for Egypt and for DOT are exactly identical," one Feneberg employee says. "The same factory is being built there."

Technical equipment has also been taken care of. "All the machinery for DOT," a former Ifat employee reports, "was delivered to Egypt more than 1 year ago." The equipment again mainly comes from MBB, but also from the Italian Fiat subsidiary "Snia." When the construction work for DOT is complete, "all the junk will be shipped to Iraq."

Two weeks ago the ousted FRG Defense Minister Rupert Scholz was asked in Israel whether German companies have indeed participated in the construction of Iraqi intermediate-range missiles. Said Scholz: Even though he does "not yet have sufficient information," the FRG Government will take care "that nothing terrible happens there."

The care is probably too late. "Construction work for DOT was completed 1 month ago," construction planner Feneberg says unofficially.

CANADA

Nuclear Activists Protest U.S. Warship Visit
51200022 Vancouver *THE SUN* in English
29 Mar 89 p B7

[Article by Jean Kavanagh]

[Text] The federal government must alert the public to the presence of nuclear warships in Canadian waters and consult the public about nuclear missile testing, peace activists protesting the arrival of a U.S. warship in Vancouver harbor said Tuesday.

Waving banners saying "Vancouver a nuclear weapons free zone," Greenpeace and Save our Seas members met the USS Hewitt, a Spruance class destroyer with Tomahawk missile capability, as it entered Vancouver harbor.

About 30 protesters later marched in front of Associate Defence Minister Mary Collins' downtown office, activist Brian Salmi said.

The protesters, who want the federal government to honor the city's status as nuclear weapons-free zone, presented Collins' assistant Pam Glass with documentation of the "frequent presence of nuclear weapons in Vancouver harbor," Salmi said.

FEDERAL REPUBLIC OF GERMANY

Illegal Exports Give Pakistan Weapons Capability

LD2004150689 Hamburg DPA in German

1349 GMT 20 Apr 89

[Excerpt] Bonn (DPA)—Illegal nuclear exports by Federal German firms are enabling Pakistan to construct nuclear weapons. The Bonn nuclear investigatory commission came to this conclusion today after consulting the Hanau public prosecutors, who are investigating the matter. They based this conclusion on a report that just came in yesterday.

The tritium collection and refining installation, supplied by the Nukleartechnik GmbH and PTB [Physical Technical Consulting] firms, was suitable only for military purposes, Commission chairman Hermann Bachmeier (Social Democratic Party of Germany) reported to journalists after the closed session. The deliveries, valued at DM20 million, were by and large more extensive than had been presumed up until now.

A senior employee of the Max Planck Institute for Plasma Physics, near Munich, where the installation was developed, played a decisive role. He illegally marketed his knowledge through a firm he set up himself. Among other things, the public prosecutor's office is investigating violations of the law for the control of weapons to war zones and of the foreign trade law. In the summer, the office intends to bring charges against several senior employees of the above-mentioned firms and the physicist. [passage omitted]

Press Comments on Reprocessing Discussion

AU2104152189 Cologne Deutschlandfunk Network in

German 0505 GMT 21 Apr 89

[From the press review]

[Text] The FRG press today comments on the recent German-French summit. NEUE OSNABRUECKER ZEITUNG states: Paris got a surprise. Francois Mitterrand accommodated his friend Helmut Kohl on the delicate issue of nuclear cooperation. Contrary to expectations, the president complied with the chancellor's wish to maintain "two pillars" for nuclear reprocessing. This agreement has given the head of the FRG Government fresh leeway in his negotiations about the Wackersdorf plant. France and the FRG want to resolve the most urgent energy-political problem jointly. The European partners should support the two sides, according to Mitterrand's wishes. Supranational regulations are being sought with a view to the single market. With this guideline, Kohl and Mitterrand have set the general course for the work of the high-level committee that has been established to work out details of the cooperation by fall. A complete abandonment of the Wackersdorf

project, which was expected after the announcement of the planned cooperation between the German Veba Group and the French firm Cogema, does not seem realistic.

BREMER NACHRICHTEN raises the question whether this planned cooperation agreement opens up new fields for Franco-German cooperation, as suggested by the chancellor. Rivalries between the two states have prevented this so far, and the nuclear-political concepts of the two states have always been too far apart to allow such premature hopes. Even the official joint statement, in which the two partners stipulated their rapprochement, reveals the traditional subtle differences, if not conflicting views. Whereas the Germans hope for two reprocessing units—the chancellor speaks of "two pillars"—the French are considerably more cautious. They used the conditional mood in their statements. One plant would apparently be sufficient for them.

FINLAND

Teollisuuden Voima Begins Excavation of Nuclear Waste Disposal Site

51002424 Helsinki HELSINGIN SANOMAT in Finnish
11 Mar 89 p 12

[Report: "Teollisuuden Voima Excavates Tunnels and Hall of Waste Disposal Site; Olkiluoto Bedrock Proves Suitable"]

[Text] Teollisuuden Voima (TVO) has finished excavating the drive tunnels and crane hall at Eurajoki for the waste disposal site of its nuclear power plants. For the first time in Finland, the final storage place is now being built for nuclear power plant wastes. During the work, the Olkiluoto bedrock proved suitable, as predicted, for storing nuclear waste.

In addition, the nuclear power plant visitors' center at Olkiluoto is now being expanded. TVO has sensed that citizens once again have a more favorable attitude toward nuclear power.

TVO managing director Magnus von Bonsdorff says that the company intends to make it possible for more people than ever to become acquainted with the operation of nuclear power plants. At present, roughly 8,000 persons visit Olkiluoto yearly, and the number of guests may double after the new visitors' center is finished.

Bonsdorff believes Finland will build more nuclear power plants, although no decision has been made by the present government. But TVO works all the time to make the public more sympathetic to nuclear power, and the company can quickly launch construction of a new power plant once the decision to build is made.

The display Friday of excavation work on the final storage site for so-called low-level and medium-level wastes was also part of TVO's pronuclear campaign.

The Olkiluoto power plants have operated for about 10 years, and the low-level and medium-level wastes they have accumulated are now locked up in drums for temporary storage. A final disposal site for these nuclear wastes will be ready in 1992 in the Olkiluoto bedrock, roughly a kilometer from the power plants.

During the years of excavation work, a 700-meter-long drive tunnel was dug into the rock, as was a 400-meter-long excavation tunnel 100 meters deep beneath two waste silos. Also excavated was a crane hall 60 meters deep above the silos.

Work on the bedrock did not produce any surprises. Next begins excavation of the silos themselves, two 35-meter-deep storage silos, downward into the bedrock from a depth of 70 meters.

Compact Place Found for Storage

The waste disposal site is located on a large, intact block of bedrock. Deep underground, the powerful crane hall appears dry and compact, at least superficially. Kai Jakobsson, a research scientist from the nuclear waste division of the Radiation Safety Center, and Heikki Niini, a professor of economic geology at the Institute of Technology, consider the Olkiluoto bedrock good for storage.

Neither wants to call the grade of rock exposed by excavation surprisingly good because the rock corresponds to the good results obtained by drilling. But both assert that there have been no negative surprises in the work done so far. Niini estimates the age of the crane hall's stone walls as 1.8 billion years. "We've succeeded in finding a level and compact place for storage."

Low-level wastes consist of radioactive junk such as towels, rags, insulators, and protective plastic, which accumulates from maintenance work on the power plants. The medium-level waste is the filter substance used in water purification. It is estimated that, during the two power plants' 30 years of operation, approximately 28,000 drums of waste will be produced.

The drums of waste are driven down into the crane hall and from there lowered into the silos. The rock tomb will finally be shut in the 2050's after the nuclear power plants' discharge wastes have been conveyed there.

The waste disposal site to be ready in 1992 will cost 75 million Fmk. The entire system is designed so that in the same place additional silos can be built for wastes for new nuclear power plants.

TVO has also worked out plans for the final storage of spent nuclear fuel in five potential localities, and a decision on the location will be made by the end of the century, at the latest.

Imatran Voima also intends to bury wastes from Loviisa's nuclear power plants in the bedrock near the power plants. Construction of this waste disposal site may begin in a few years. Sweden already has a similar nuclear waste disposal site under the sea bottom near Forsmark.

ITALY

'Successful Experiment' of 'Cold' Nuclear Fusion

AU2704090189 Rome ANSA in English

0820 GMT 27 Apr 89

[Text] (ANSA) Perugia [no date as received]—Successful experiments of so-called cold nuclear fusion have been carried out by researchers at the Physics Department of Perugia University, department sources confirmed on Wednesday.

News of the experiment in this northern Italian city was leaked by a newspaper and an official announcement is expected at a press conference scheduled for Thursday.

The nuclear fusion was reportedly carried out by the team of professors Fabio Massimo Mazzolai, Roberto Battiston and Rita Borio, using electrolytic cells, electrolysis with palladium and silver, and titanium in a deuterium atmosphere.

"Neutron emissions which may be caused by cold fusion phenomena were observed," the sources said.

On April 18, scientists at the National Atomic and Alternative Energy Agency near Rome announced they had succeeded in performing cold fusion without the use of electricity.

NORWAY

AFP Says Heavy Water Diverted to India

AU2004184789 Paris AFP in English

1711 GMT 20 Apr 89

[Text] Oslo, April 20 (AFP)—India's Atomic Energy Agency was the recipient of 15 tons of heavy water, shipped from Norway to West Germany in 1983, and diverted to Bombay by way of Zurich and Dubai, Norwegian Radio reported Thursday.

A spokeswoman for Norway's Ministry of Foreign Affairs confirmed that the recipient in Bombay had been traced, but would not give names.

The radio news report said that documents showed the recipient to be the Directorate of Purchase and Storage in Bombay, which the report claims is a branch of the Indian Atomic Energy Commission.

The shipment was originally bought by West German businessman Alfred Hempel for use in West Germany, but was illegally diverted to India. India, who has not signed the Nuclear Non-Proliferation Treaty, cannot

under international regulations buy more than one ton of heavy water annually. Heavy water is a key ingredient in the production of plutonium, which is used in atomic bombs.

The Ministry of Foreign Affairs said it might ask Indian police for assistance in investigating the matter.

SWITZERLAND

Bern Rally Protests French Nuclear Plant

LD2204160389 Bern International Service in English
1530 GMT 22 Apr 89

[Text] In Switzerland thousands of demonstrators have begun a rally in the capital, Bern, to protest against the reopening of a French nuclear power plant near the Swiss border. The rally comes a day after the Super Phoenix reactor at Creys Malville was relinked to the French power network following a 2-year closure for repairs.

The antinuclear protestors are particularly critical of the Swiss Government, which this week issued a report saying the Super Phoenix plant was as safe as other nuclear power stations.

The Bern rally also marks the third anniversary of the Chernobyl nuclear disaster in the Soviet Union.

TURKEY

'Secret' U.S. Nuclear Fuel Embargo Reported

TA1404145789 Istanbul HURRIYET
in Turkish 12 Apr 89 p 13

[Aziz Utkan report]

[Text] Ankara (HURRIYET)—It has been revealed that in recent years, the United States has imposed on Turkey a "secret" embargo on nuclear fuel, which has threatened the three Turkish nuclear reactors, the two in Kucukcekmece and the other in Ayazaga, with being without any fuel.

It is reported that due to that embargo, Turkey is taking important steps in a bid to establish its own "independent" nuclear technology and that great progress has already been made in this direction. While a French proposal broke the U.S. embargo, the production of a small-scale nuclear reactor in cooperation with Argentina is now in the works.

Atila Ozmen, director of the Turkish Atomic Energy Commission (TAEK) has told HURRIYET about the U.S. embargo and the significant developments achieved in Turkey in this field since then. He said: The technology we are going to use now will give us the possibility of depending very little on others.

Pointing out that the reactors to be built in cooperation with Argentina will be sold to Middle Eastern, African, and Balkan countries through the private sector, Ozmen said that the best location for that reactor is Akkuyu and that currently some 150 workers are carrying out the necessary structural work.

The U.S. embargo on nuclear fuel was imposed after it was revealed that Pakistan had sold an "inventer" [last word in English] machine to Turkey. Opposing this sale, the United States refused to send back the Turkish uranium sent to be "processed," and held it as an "element of pressure." The United States simply told Turkey that it would pay the \$25 million the uranium was worth.

As a result of this U.S. stand, which was kept "secret" from the public and the press, 17 kilos of Turkish nuclear fuel was kept in U.S. hands. As a result, the three nuclear reactors in Kucukcekmece and Ayazaga were threatened with being without any fuel.

This stand by a major friendly country like the United States, which is also our ally, created a serious problem in Ankara. This question was taken up by Turkish officials, including President Kenan Evren and Prime Minister Turgut Ozal, during their contacts in the United States. The United States, nevertheless, continued to impose its embargo on Turkey, which came to be known as the "Uranium-235 Embargo."

Developments in this field in the wake of the embargo were first revealed to HURRIYET by Ozmen. He said: We needed this fuel. We decided to apply to U.S., French, Canadian, British, Japanese, Argentine, and FRG firms that specialize in this field. Some firms did not even answer our letter; others, like some British firms, announced that they could not supply the fuel to us as they needed U.S. authorization. Since Turkey is one of the countries that has signed the Nuclear Proliferation Treaty, we had no secret aims. All our work is under the supervision of the International Atomic Energy Agency.

Ozmen did not try to minimize the problems created by the U.S. embargo, saying that Turkey set for itself the following clear policy lines: If the United States refuses to supply nuclear fuel, this will not be the last word. The first thing we can do in the face of the U.S. refusal is to acquire the fuel from another source. If that proves impossible, we can try to process our own fuel. The stock of fuel in our hands can last us for another 3 to 4 years. If that also proves impossible, we can decide to close our reactors, without causing any financial damage.

Pointing out that Turkey's reactors work in the medical field, Ozmen said: Our profit from this production reached 140 million Turkish lira last year. We used up

fuel worth 400 million lira to do so. If we add to this our overhead expenses, it becomes clear that financially speaking, the closing of our reactors would not create any loss.

Ozmen explained that once the sale of the "inventor" machines by Pakistan to Turkey began to be supervised, the U.S. stand improved. He continued: Consequently, the United States proposed to us the renewal of the Nuclear Cooperation Agreement, which had expired in 1981. Mr Steauberg, an official from the U.S. State Department's nuclear desk, arrived in Turkey some time ago for this purpose.

Recalling that U.S. officials explained that the nuclear fuel embargo was due to the expiration of the agreement between the two countries, Ozmen said: In the wake of this development, we are about to establish a connection with France. We have reached an agreement in principle. The French COGEMA SERFTA-CEEN firm will supply us with 20 percent enriched fuel as a "complete fuel element."

Noting that in May 1987, Turkey signed a bilateral nuclear cooperation agreement with Argentina, one of the world's leading countries in the field of nuclear technology, Ozmen said: We are willing to sell the nuclear technology developed by Argentina to countries in the Balkans, the Middle East, and Africa.

Ozmen explained that last year Argentina offered to build Turkey a small-scale reactor with a 15-25 megawatt capacity (an electricity capacity of 1 million watts) and continued: This system is still being developed there. They have offered us a joint venture. We are planning to build two reactors, one of them in Argentina and the other in Turkey. This is in accordance with an independent project that we had thought to use to promote our own nuclear technology—in other words, to build a small-scale reactor to produce electrical energy whose cost would be within our means. The Argentine offer suits our objectives.

Ozmen said that they have encouraged private firms to cooperate with the Argentine firms to speed up the project. He added: We believe the formation of a joint investment firm will be useful. The Argentines are in contact with the Sezai Turkes Feyzi Akkaya firm to this end.

Ozmen explained that both countries have agreed to sell to third countries the nuclear technology they are going to develop. In response to a question on whether Turkey's dependence on Argentine technology has any disadvantages, he said: The technology being developed by Argentina is the system used in the FRG and Canada. It is not a totally new system. All nuclear technologies are based on the principle of producing uranium from heavy water developed by these two countries. What the Argentines have done is to make the 150-megawatt German Siemens reactor smaller. In other words, we are not being isolated from Western nuclear technology.

Ozmen recalled that the 15-25 megawatt small reactor produced by Argentina can also be used to power nuclear submarines. He added: There are many publications on this subject internationally. Sometimes, they also refer to Turkey.

In reply to the question as to which third countries the jointly built nuclear reactors would be sold, he replied by recalling that the private sector will determine that. He continued: This project will be carried out by private firms; that is to say, it will be a commercial project. Since we are one of the countries abiding by the Nonproliferation Treaty, we can find out what we can sell to which countries. Naturally, Turkey will decide what to sell to whom. Iran and Pakistan are also interested in this project. So far this affair has developed outside Turkey. We, the Turkish state, have not been able to grasp the importance of this affair. From now on, however, we will be involved in this game in accordance with its rules.

Ozmen said that it was in the 1970's that Turkey decided to build its own reactor. He recalled that two locations were then chosen for this project, one in Akkuyu and the other in Sinop. At this moment 150 workers are busy preparing the construction site for the nuclear reactor. All the understructure and the port installation are ready. Akkuyu is the ideal location for the small nuclear reactor we are going to receive from Argentina.

Pointing out that TAEK's budget is 10 billion lira, and that only 4 billion of this is used for research and investment, Ozmen said: This is why we prefer the small-scale reactors. It will cost us \$30 to \$40 million. If we divide this by 6 years, it means that we will have to pay \$4 to \$5 million a year. This is an amount we can meet from our own budget. A large reactor, on the other hand, costs \$3 to \$4 billion, an amount we cannot pay.

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